Racial and ethnic disparities in type 2 diabetes

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Relevant financial disclosures

- None

Objectives

- Discuss disparities in diabetes prevalence and outcomes among racial/ethnic minorities

- Detail strategies to address racial/ethnic disparities impacting diabetes

DISPARITIES IN DIABETES PREVALENCE

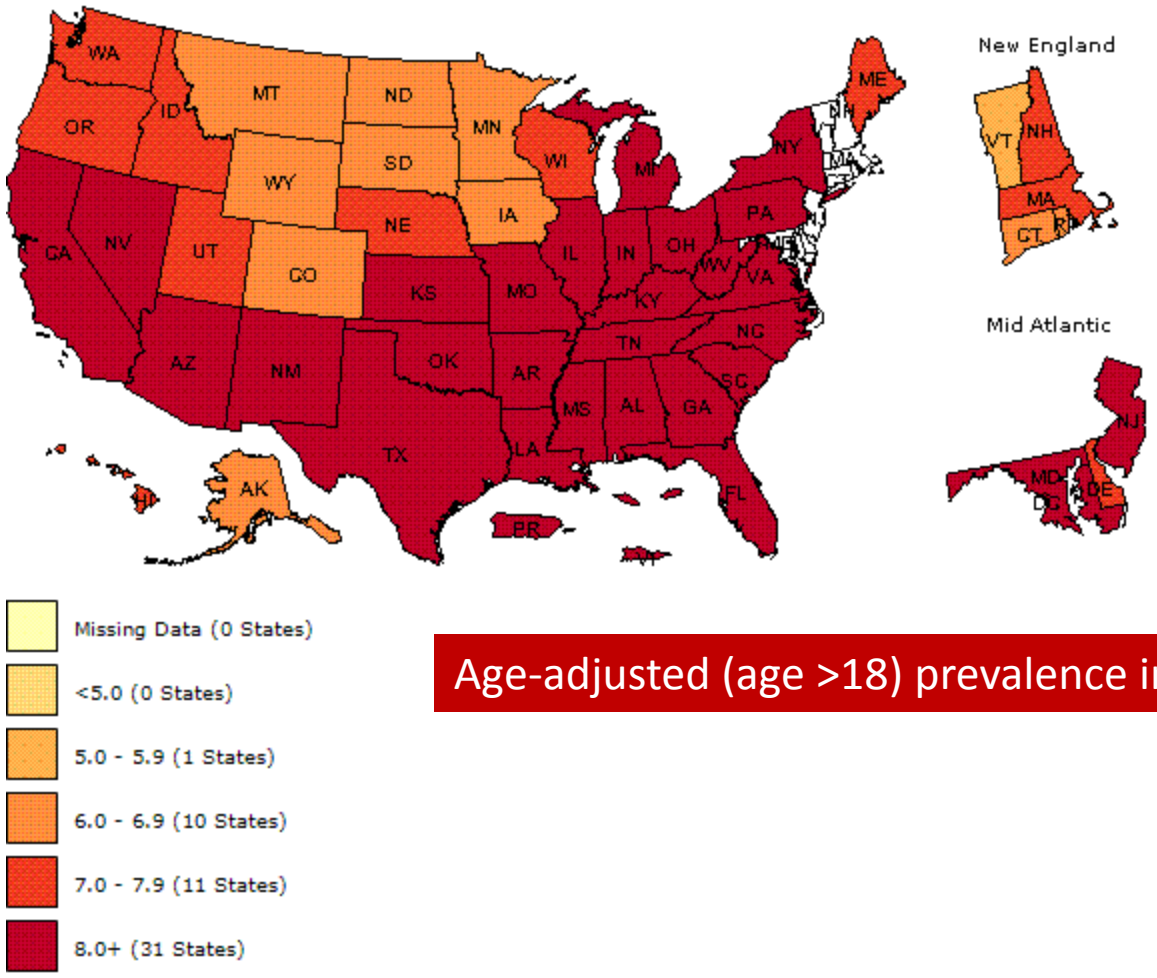
Diabetes prevalence in the U.S.

	Number with diabetes (millions)	Percentage with diabetes (unadjusted)
Total		
20 years or older	28.9	12.3
By age		
20–44	4.3	4.1
45–64	13.4	16.2
65 years or older	11.2	25.9
By sex		
Men	15.5	13.6
Women	13.4	11.2

Source: 2009–2012 National Health and Nutrition Examination Survey estimates applied to 2012 U.S. Census data.

CDC. National Diabetes Statistics Report, 2014. Atlanta GA: US DHHS.

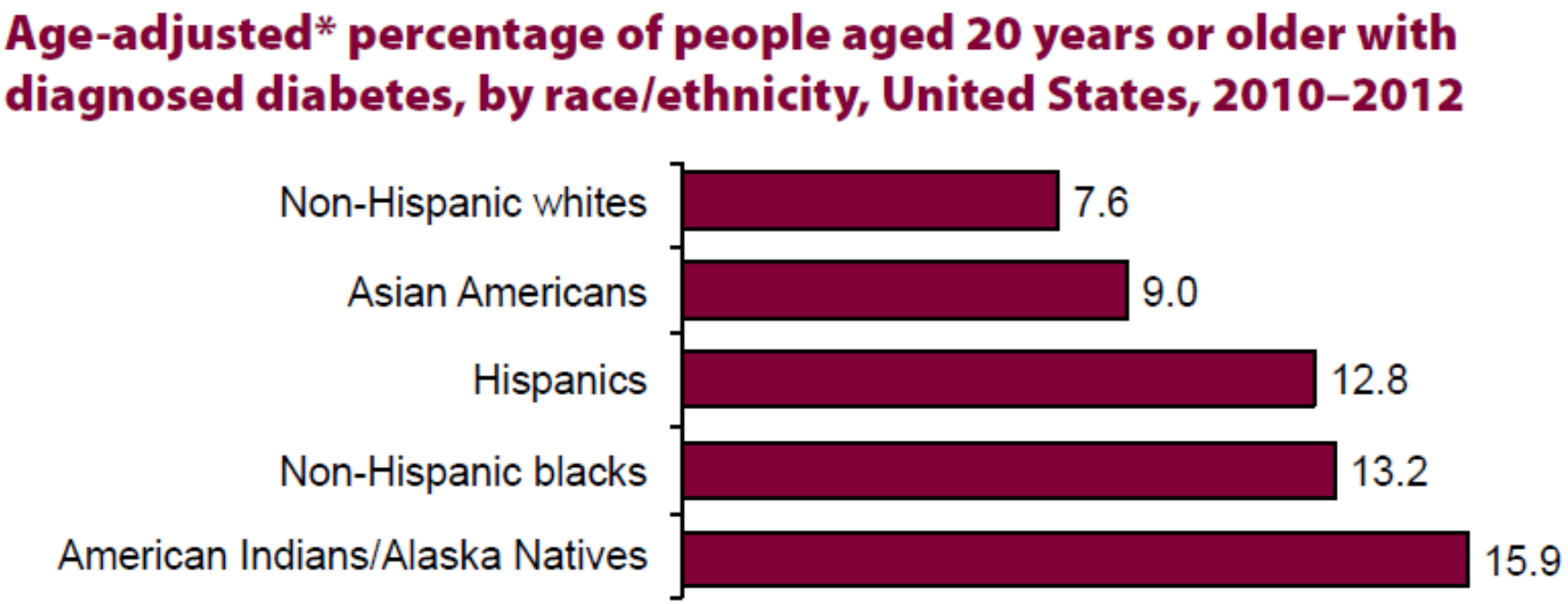
Age-adjusted prevalence of diabetes in Maryland (2010)



Age-adjusted (age >18) prevalence in: 8.9%

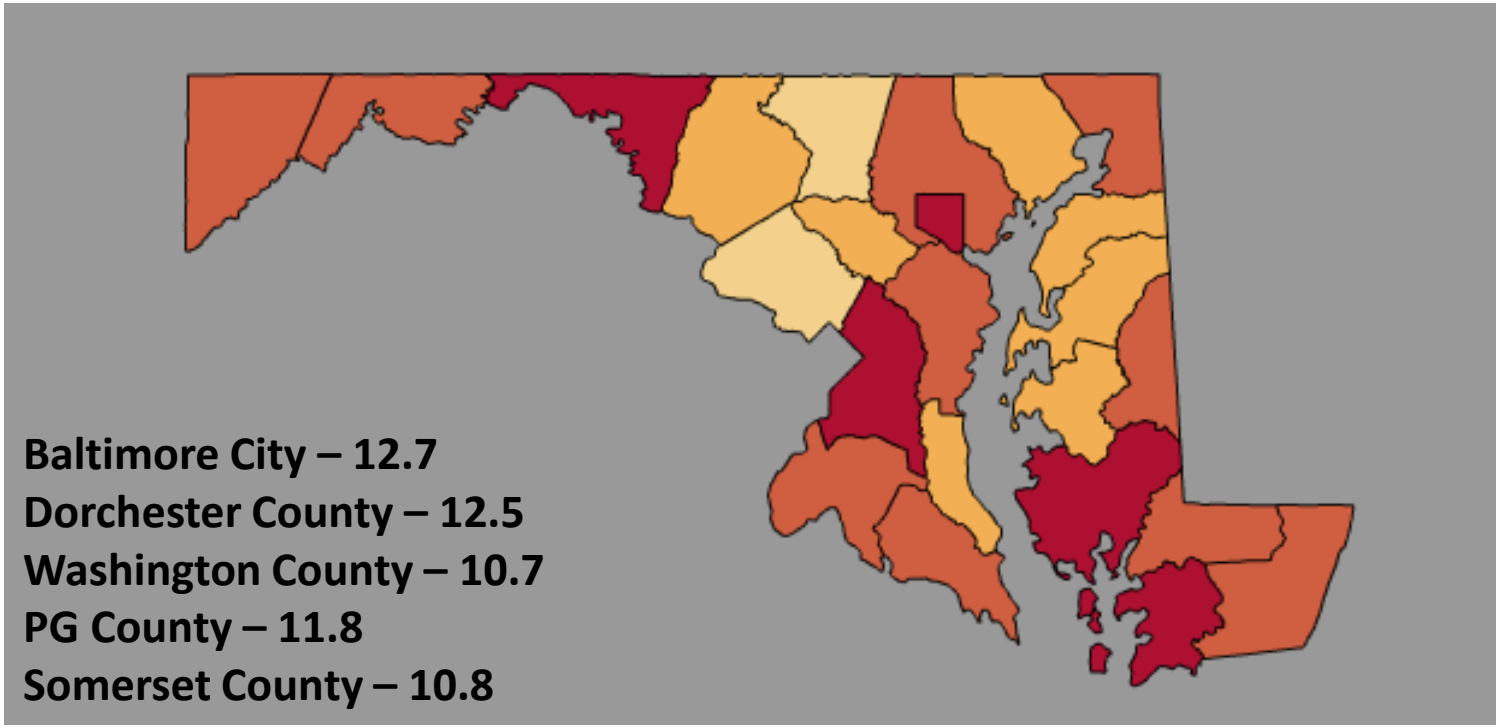
Centers for Disease Control and Prevention: National Diabetes Surveillance System. Available online at: http://www.cdc.gov/diabetes/statistics. Retrieved 6/23/2014.

Racial disparities in diabetes prevalence in the U.S. (2012)



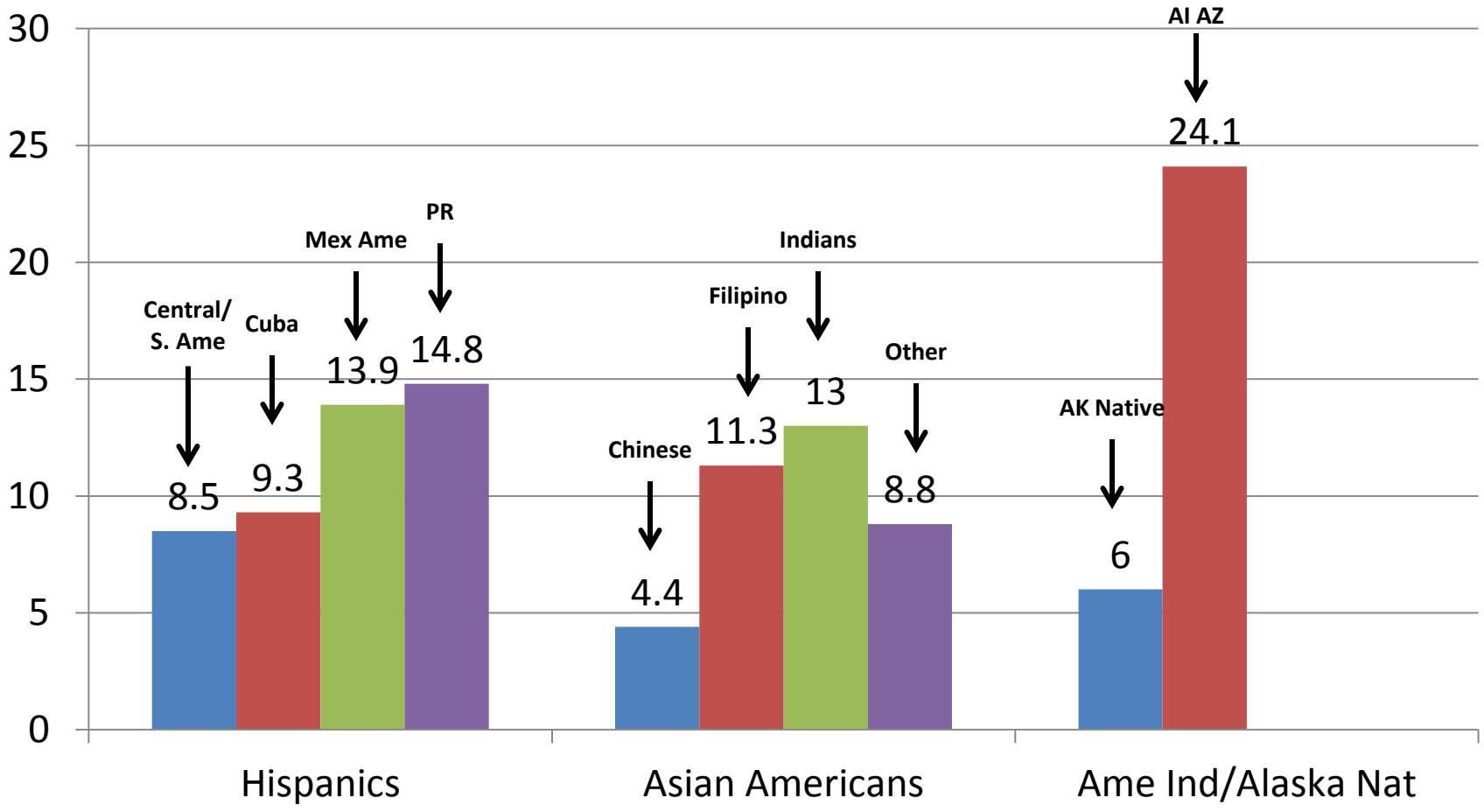
CDC. National Diabetes Statistics Report, 2014. Atlanta GA: US DHHS.

Age-adjusted prevalence (%) of diabetes by county (2011)



http://www.cdc.gov/diabetes/atlas/obesityrisk/24/atlas.html

Variation in diabetes prevalence (%) within racial/ethnic groups in U.S. (2012)



CDC. National Diabetes Statistics Report, 2014. Atlanta GA: US DHHS.

Explaining racial differences in diabetes risk in the Atherosclerosis Risk in Communities Study

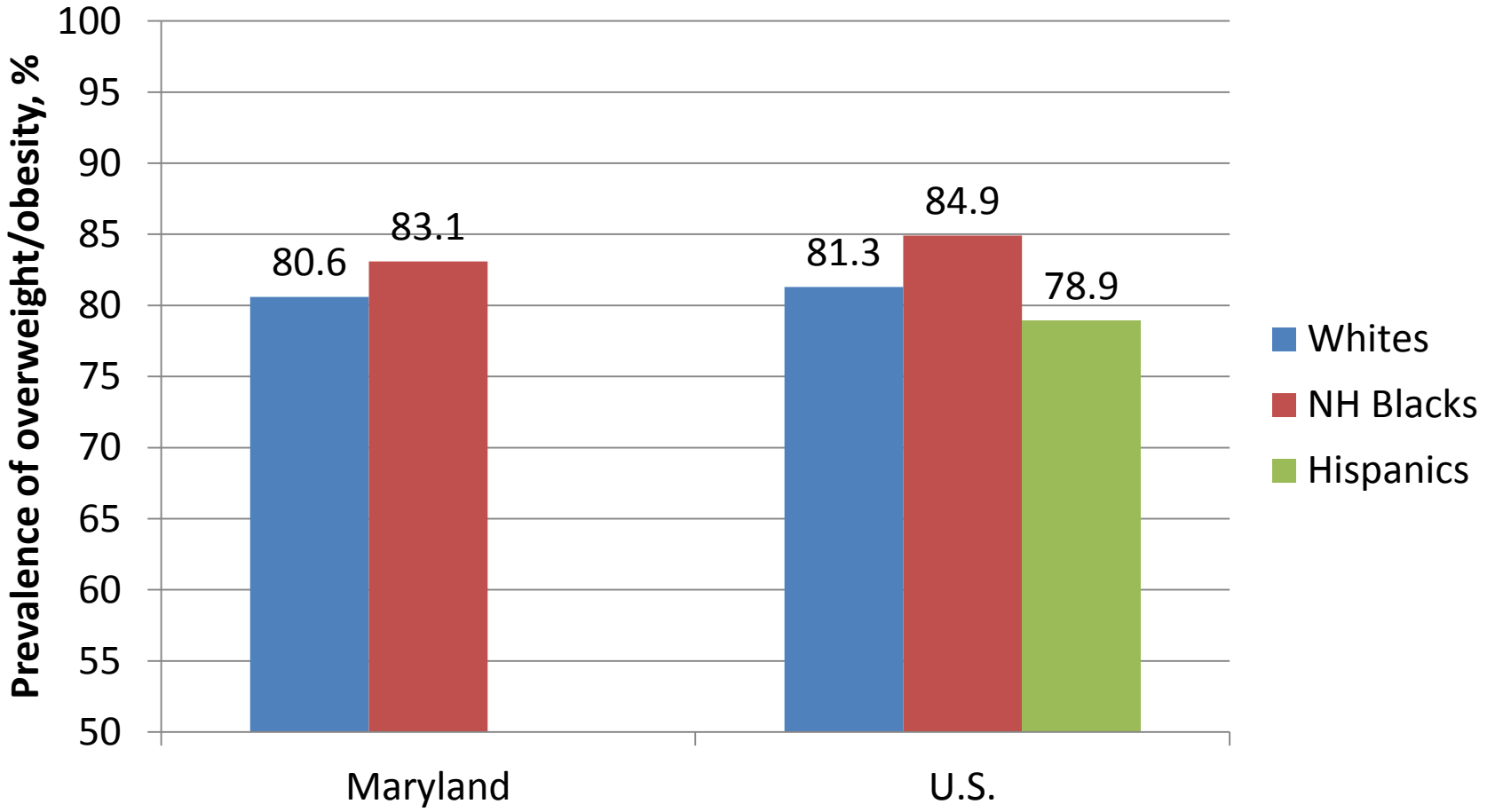
		Women	Men
Model	**Variables**	**AA (n=1670) vs W (n=5093)**	**AA (n=976) vs W (n=4368)**
1	Age, FH	2.63 (2.26-3.06)	1.58 (1.32-1.89)
2	Model 1 + edu	2.41 (2.06-2.82)	n/a
3	Model 1 + health behaviors	2.21 (1.86-2.63)	n/a
4	Model 1 + BMI, WHR	1.98 (1.69-2.31)	n/a
5	All covariates from Models 1-4	1.85 (1.55-2.21)	1.62 (1.32-1.99)

Compared to white women, AA women who developed diabetes by 9 years of follow up had higher SBP, DBP, HTN prevalence, insulin, HDL, and lower TG

Adjusted HR (95% CI) shown

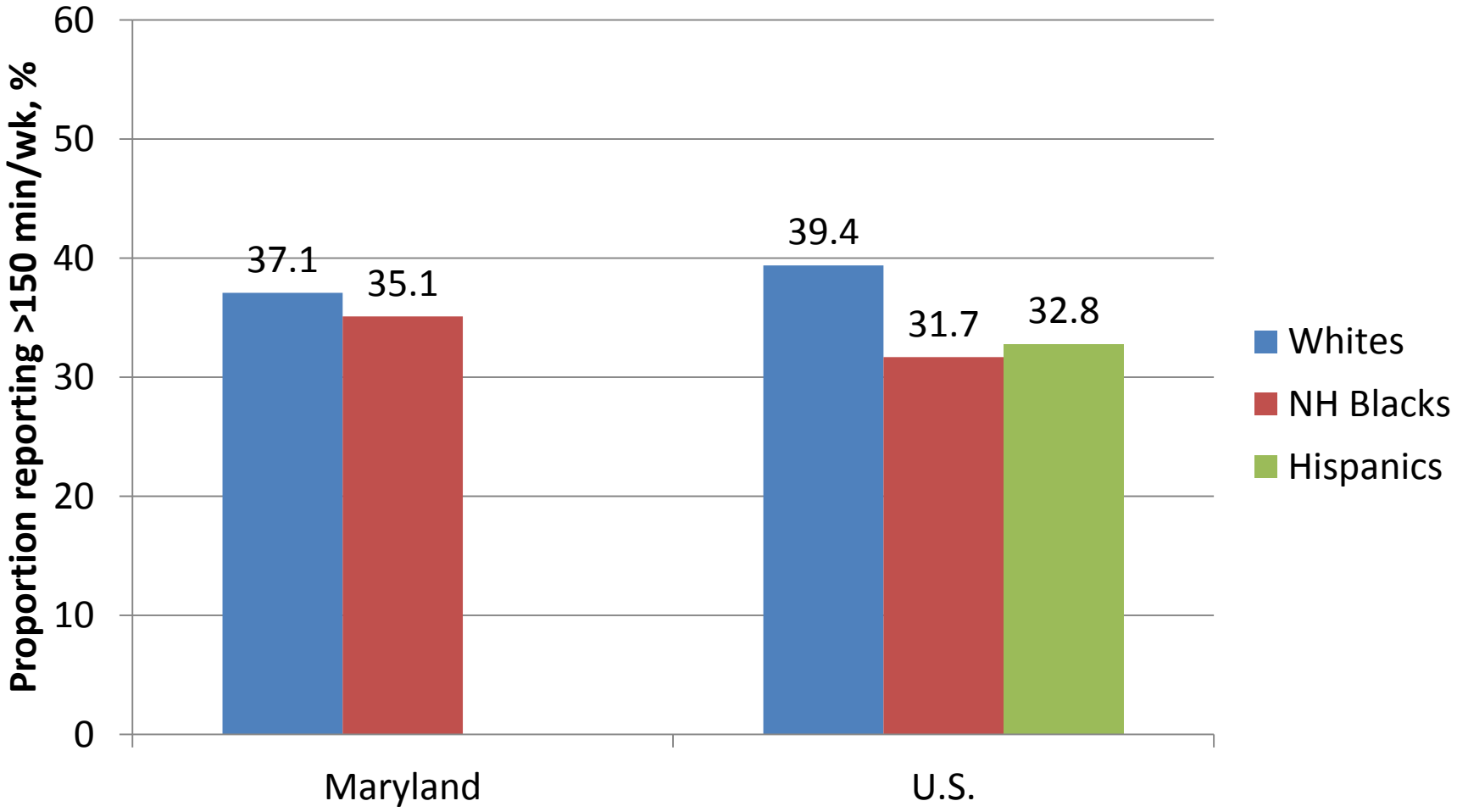
Brancati FL, Kao WHL, et al: JAMA 2000;283:2253-2259

Racial differences in overweight/obesity among adults with diabetes (2011)



BRFSS 2011

Racial differences in physical activity in among adults with diabetes (2011)



BRFSS 2011

Non-traditional characteristics as explanatory factors for the racial disparity in diabetes risk

Table 2. Incidence Rates and Partially and Fully Adjusted Hazard Ratios (HR) for Incident Diabetes by Race

	African Americans	Whites
N	2,322	8,840
Incident cases of diabetes	434	922
Incidence rate (per 1000 person-years)	27.0	13.4
Age and sex-adjusted HR (95 % CI)	2.07 (1.84, 2.32)	1.00 (ref)
Traditionally-adjusted HR (95 % CI)[a]	1.62 (1.42, 1.85)	1.00 (ref)
Fully-adjusted HR (95 % CI)[b]	1.34 (1.15, 1.57)	1.00 (ref)

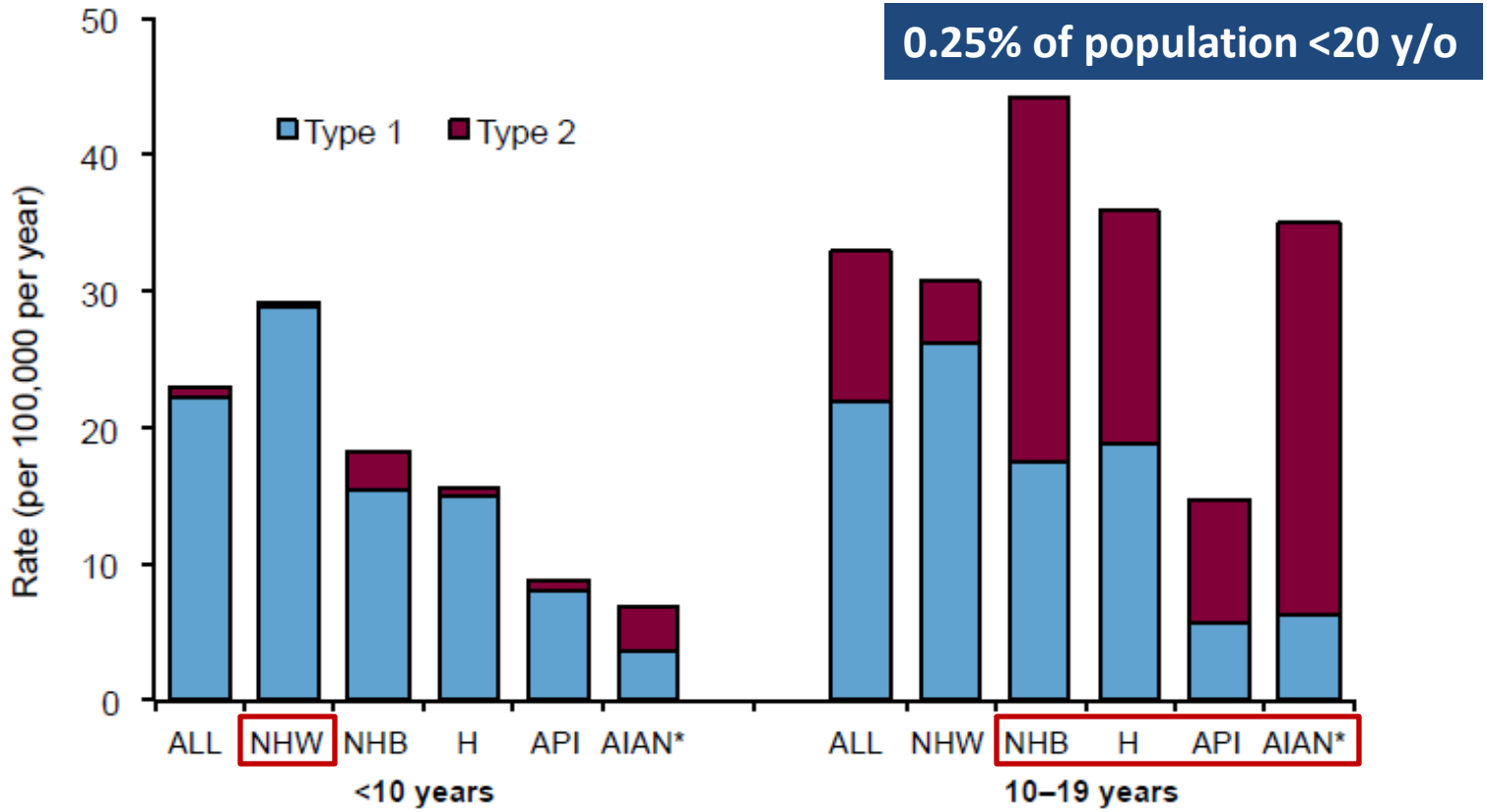
Table 4. Mediation Effects (%) (95 % CI) of the Four Main Mediators of the Association Between Race and Risk of Incident Diabetes in Our Main Model and Sensitivity Analyses

Model	BMI	FVC	Systolic Blood Pressure	Serum Potassium
Main model[a]	22.0 (11.7, 42.2)	21.7 (9.5, 43.1)	17.9 (10.2, 37.4)	17.7 (8.2, 39.4)
Self-reported diabetes outcome (9-year follow-up)[b]	26.7 (12.6, 134.0)	29.5 (11.0, 92.8)	6.6 (−5.1, 63.9)	19.8 (4.3, 107.2)
Self-reported diabetes outcome (17 year follow-up)[b]	30.1 (17.8, 62.6)	40.4 (25.1, 72.6)	18.4 (10.0, 49.1)	17.6 (5.6, 45.5)
Main model for Forsyth County participants only[a]	15.7 (−26.5, 85.7)	22.6 (−4.9, 133.0)	5.2 (−4.7, 60.0)	12.8 (−12.3, 123.5)

Chatterjee R, Brancati FL, et al.: J Gen Intern Med 2014;29:290-297

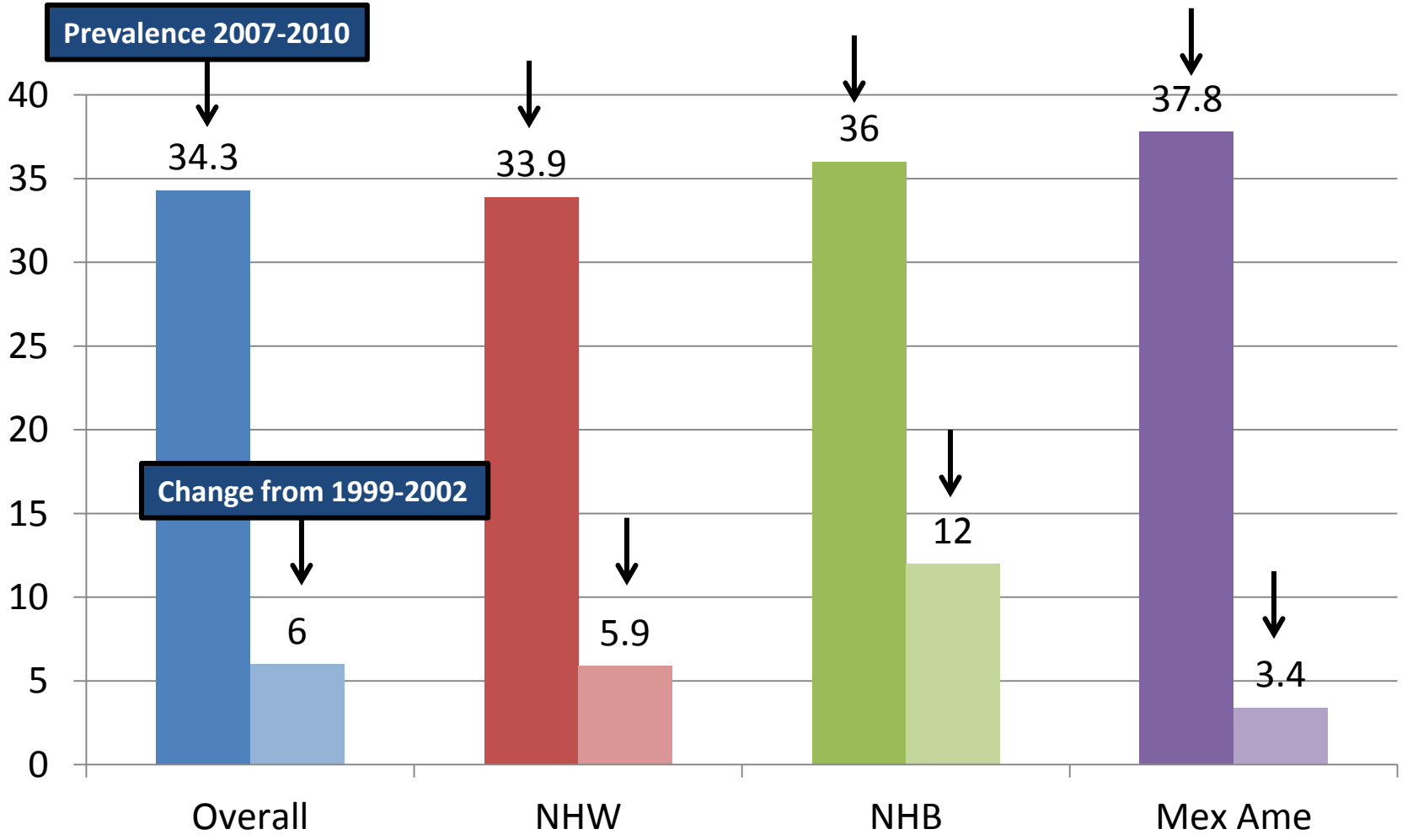
Diabetes incidence in U.S. among those <20 years (2008-2009)

0.25% of population <20 y/o



* The American Indian/Alaska Native (AI/AN) youth who participated in the SEARCH study are not representative of all AI/AN youth in the United States. Thus, these rates cannot be generalized to all AI/AN youth nationwide.
Source: SEARCH for Diabetes in Youth Study
NHW=non-Hispanic whites; NHB=non-Hispanic blacks; H=Hispanics; API=Asians/Pacific Islanders; AIAN=American Indians/Alaska Natives.

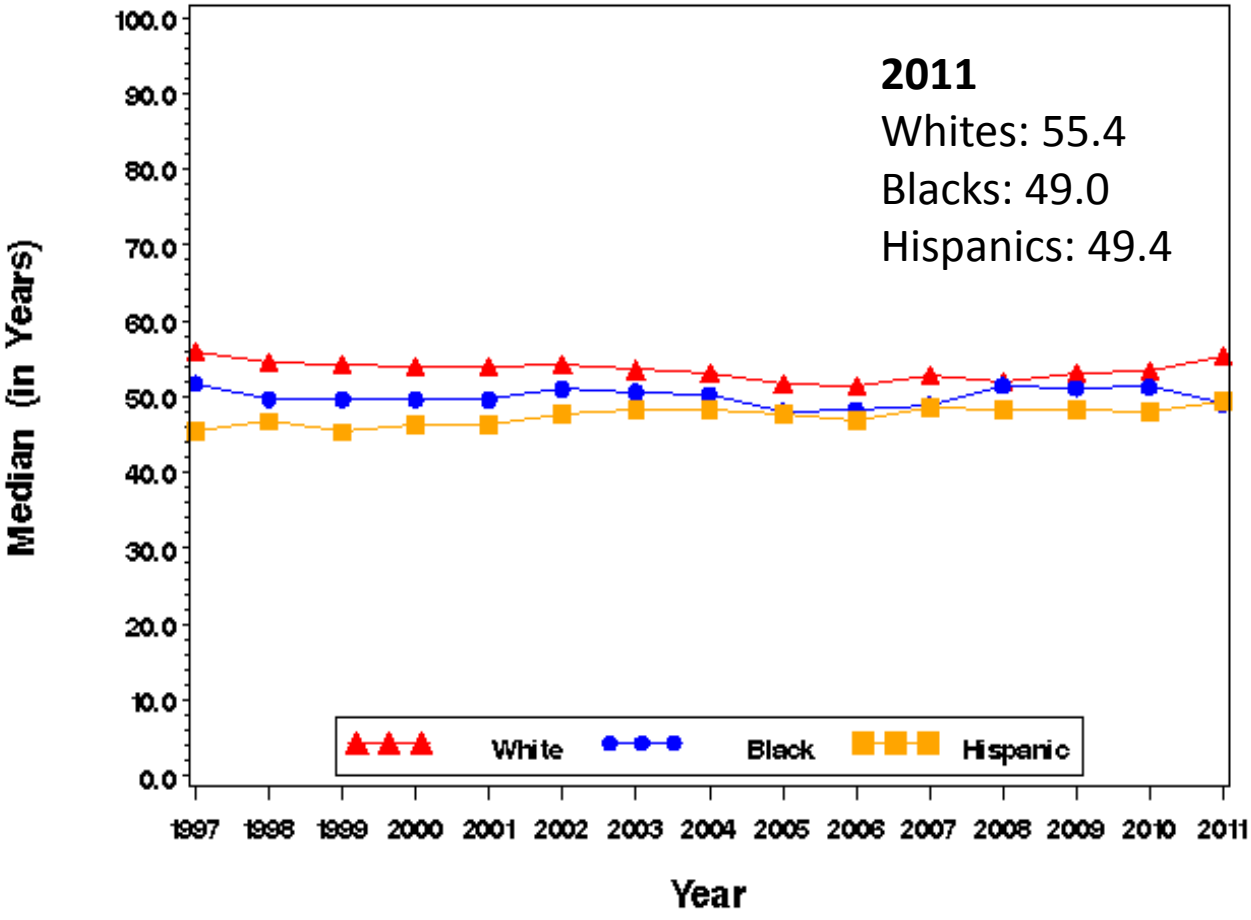
Adjusted prevalence and change in prediabetes by race/ethnicity in the U.S.



NHANES
Age ≥12
Prediabetes = HbA1c 5.7-6.4% or FPG 100-125 mg/dl

Bullard KM, et al.. Diabetes Care 2013; 36:2286-2293.

Stable but lower median age at diagnosis of diabetes for blacks and Hispanics

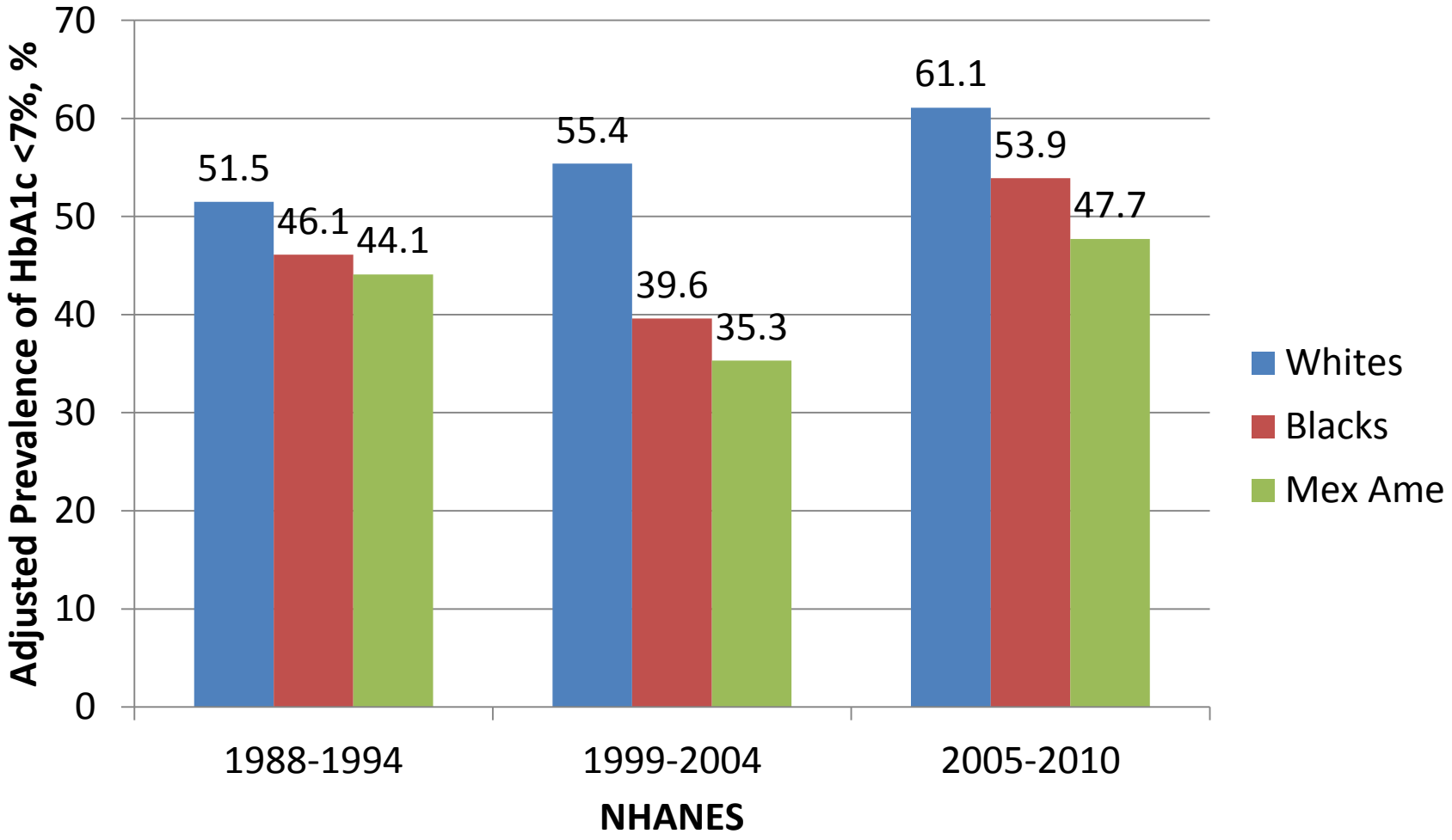


NHIS

http://www.cdc.gov/diabetes/statistics/age/fig4.htm

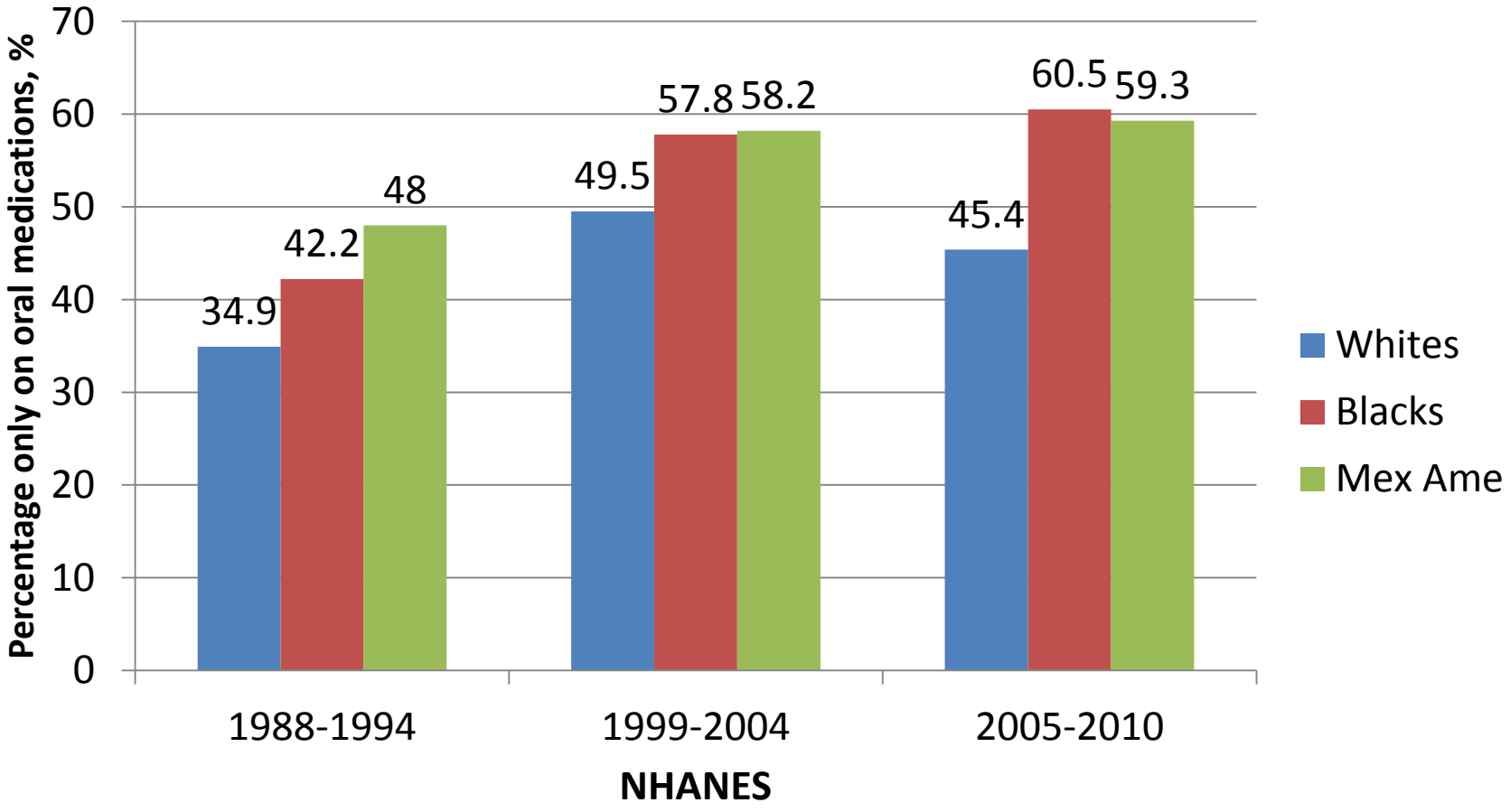
DISPARITIES IN DIABETES OUTCOMES

Poorer glycemic control in blacks and Mexican Americans vs. whites



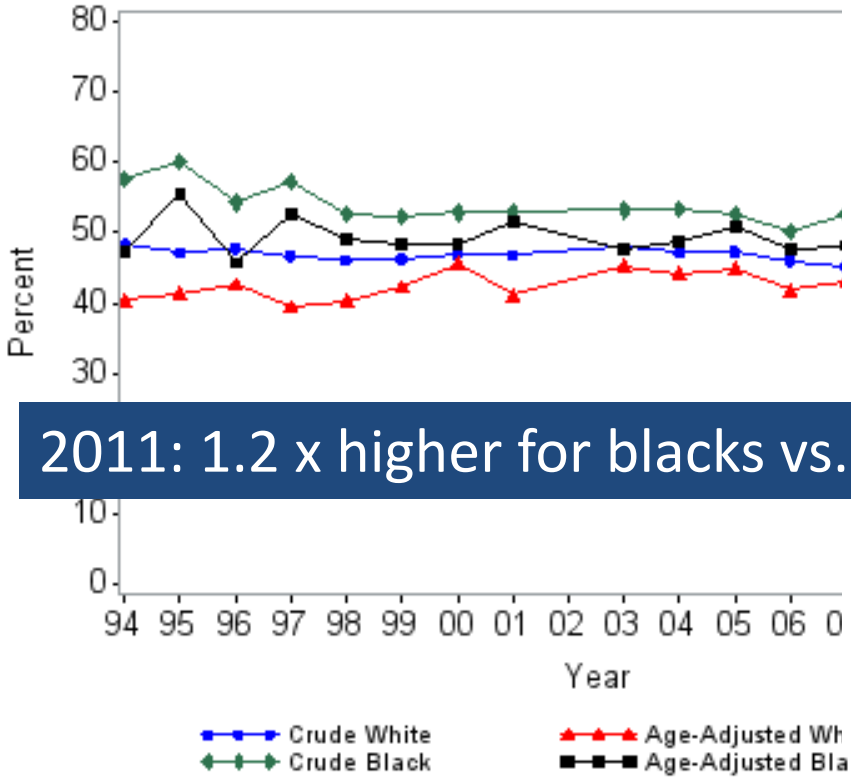
Selvin E, et al: Ann Intern Med 2014;160:517-525

Blacks and Mexican Americans more likely to be on oral treatment only for diabetes

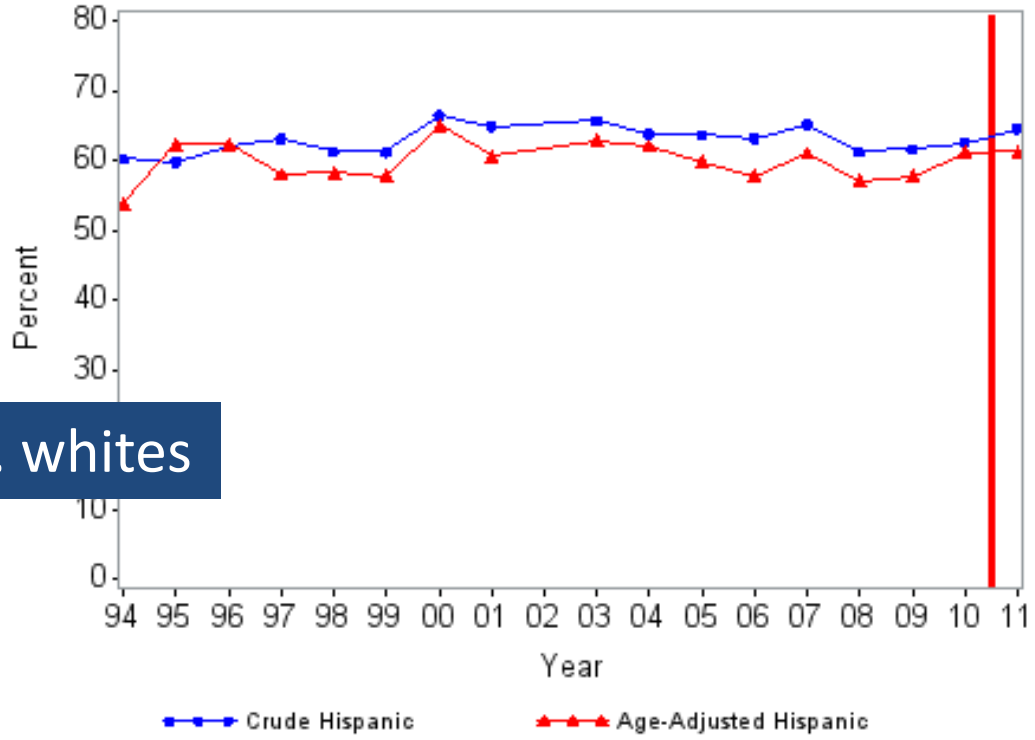


Selvin E, et al: Ann Intern Med 2014;160:517-525

Blacks and Hispanics with diabetes more likely to report fair/poor general health



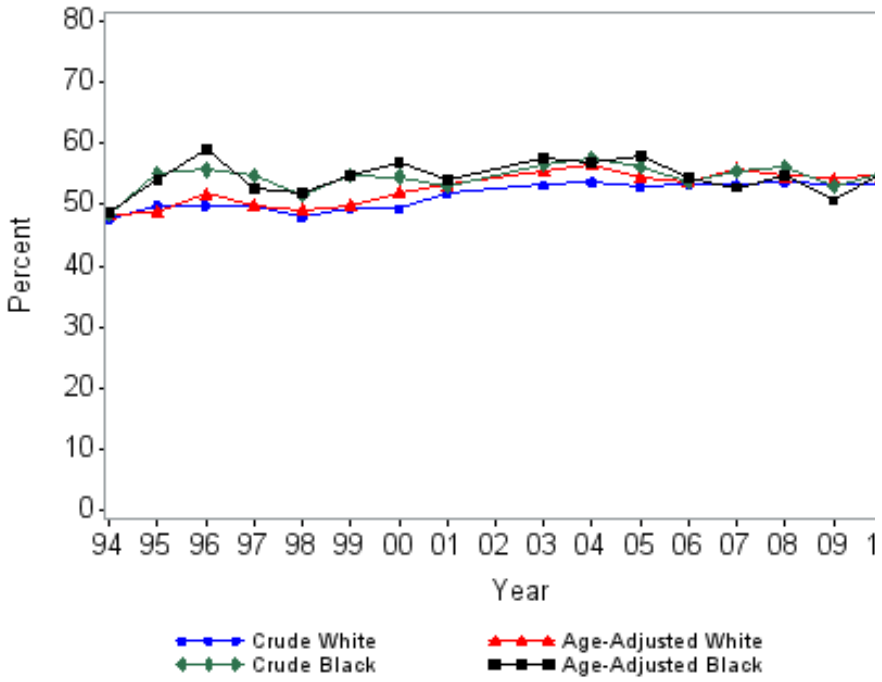
2011: 1.2 x higher for blacks vs. whites

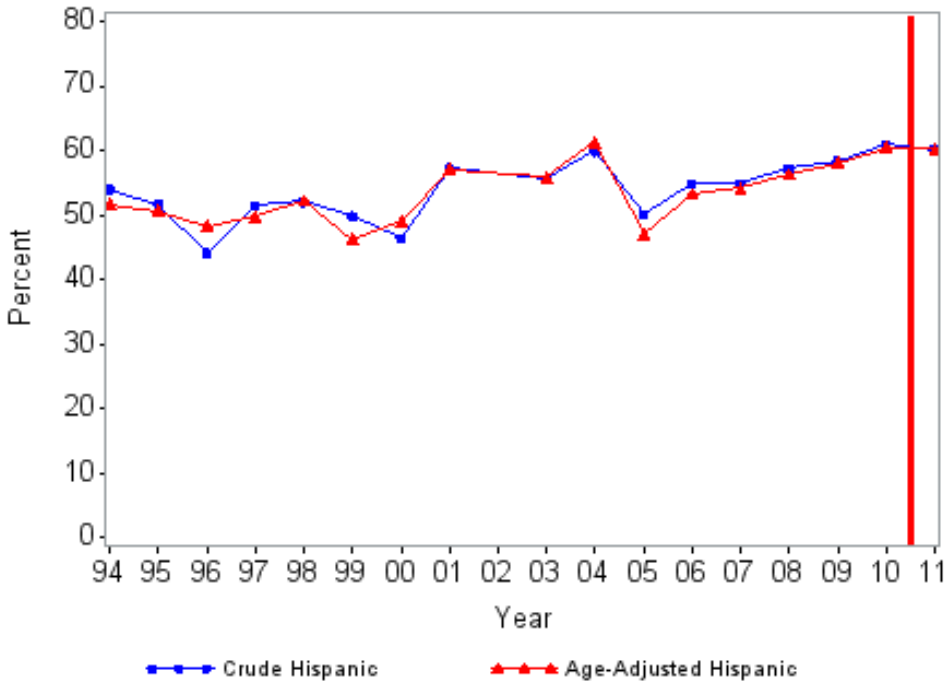


BRFSS

http://www.cdc.gov/diabetes/statistics/mental/pergeneralhealthrace.htm
http://www.cdc.gov/diabetes/statistics/mental/pergeneralhealthhisp.htm

Poor physical health in past 30 days among adults with diabetes

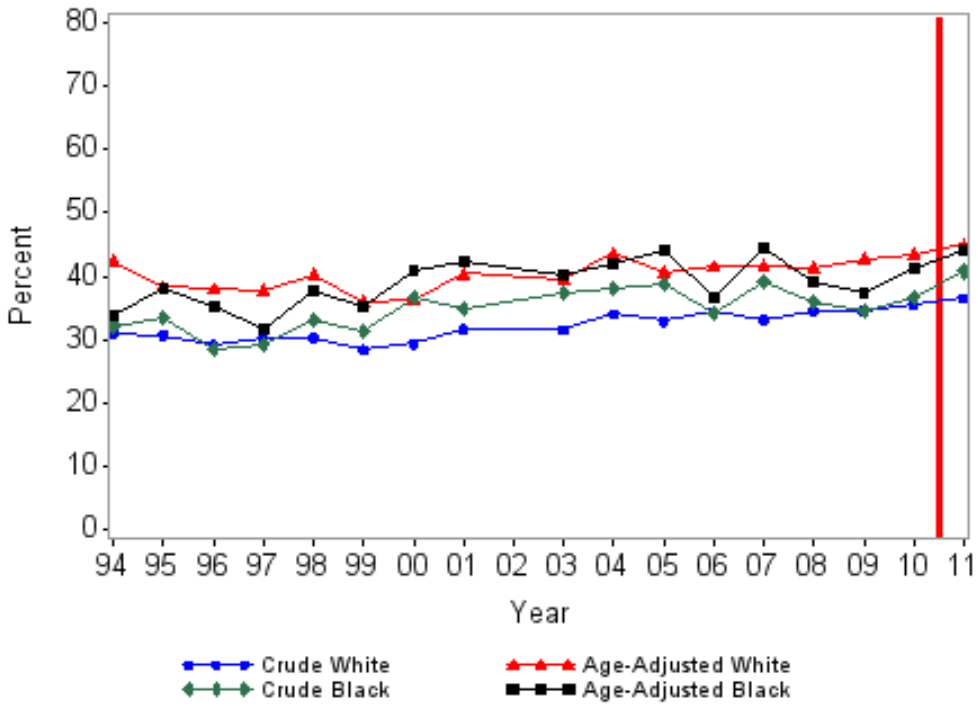


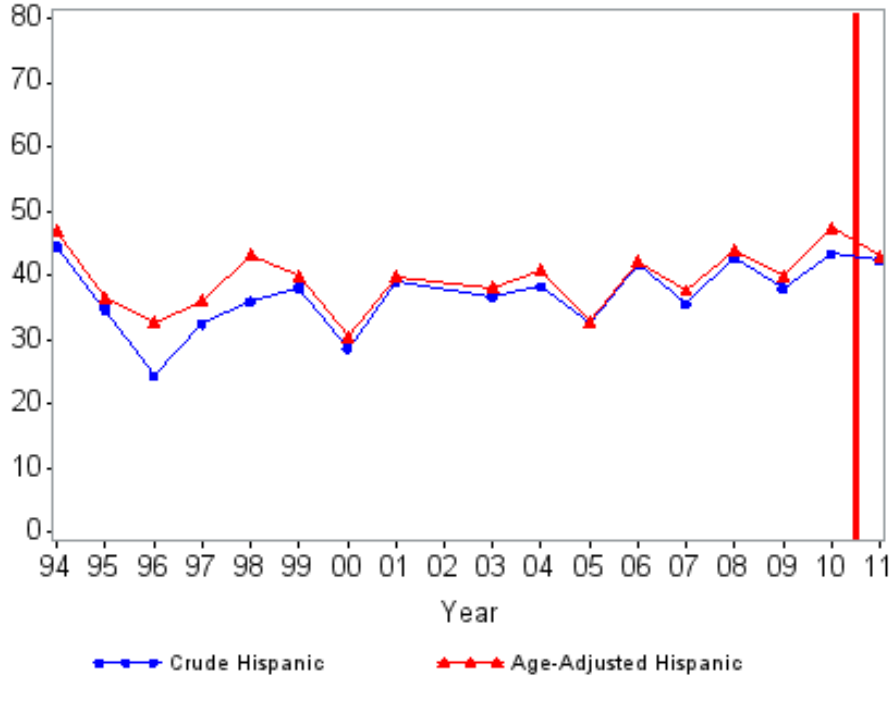


BRFSS

http://www.cdc.gov/diabetes/statistics/mental/DetailTabphyUSHisp.htm
http://www.cdc.gov/diabetes/statistics/mental/DetailTabphyUSrace.htm

Prevalence of poor mental health in past 30 days among adults with diabetes by race

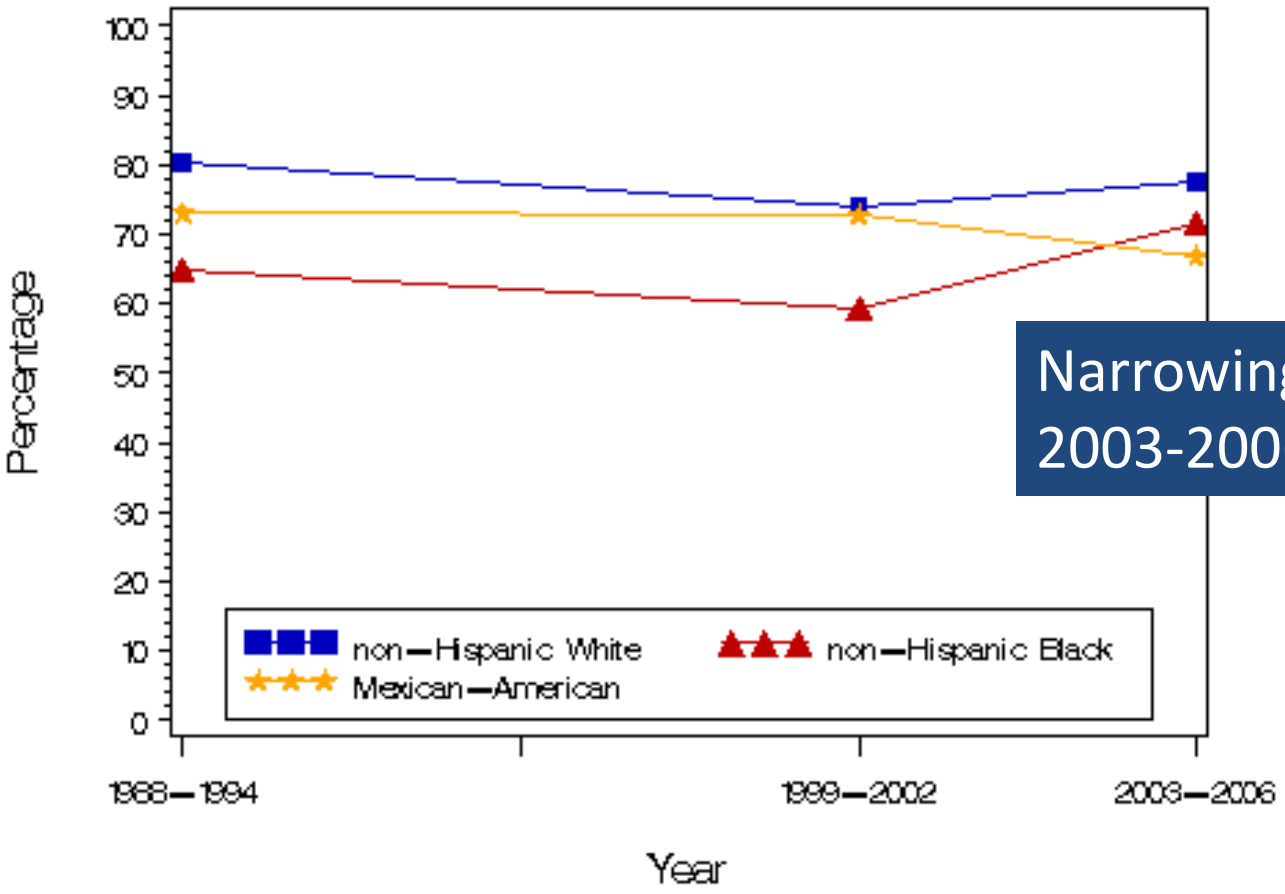




BRFSS

http://www.cdc.gov/diabetes/statistics/mental/DetailTabmentUSrace.htm
http://www.cdc.gov/diabetes/statistics/mental/DetailTabmentUSHisp.htm

Whites with diabetes more likely to have BP <140/90 than blacks and Mexican Americans

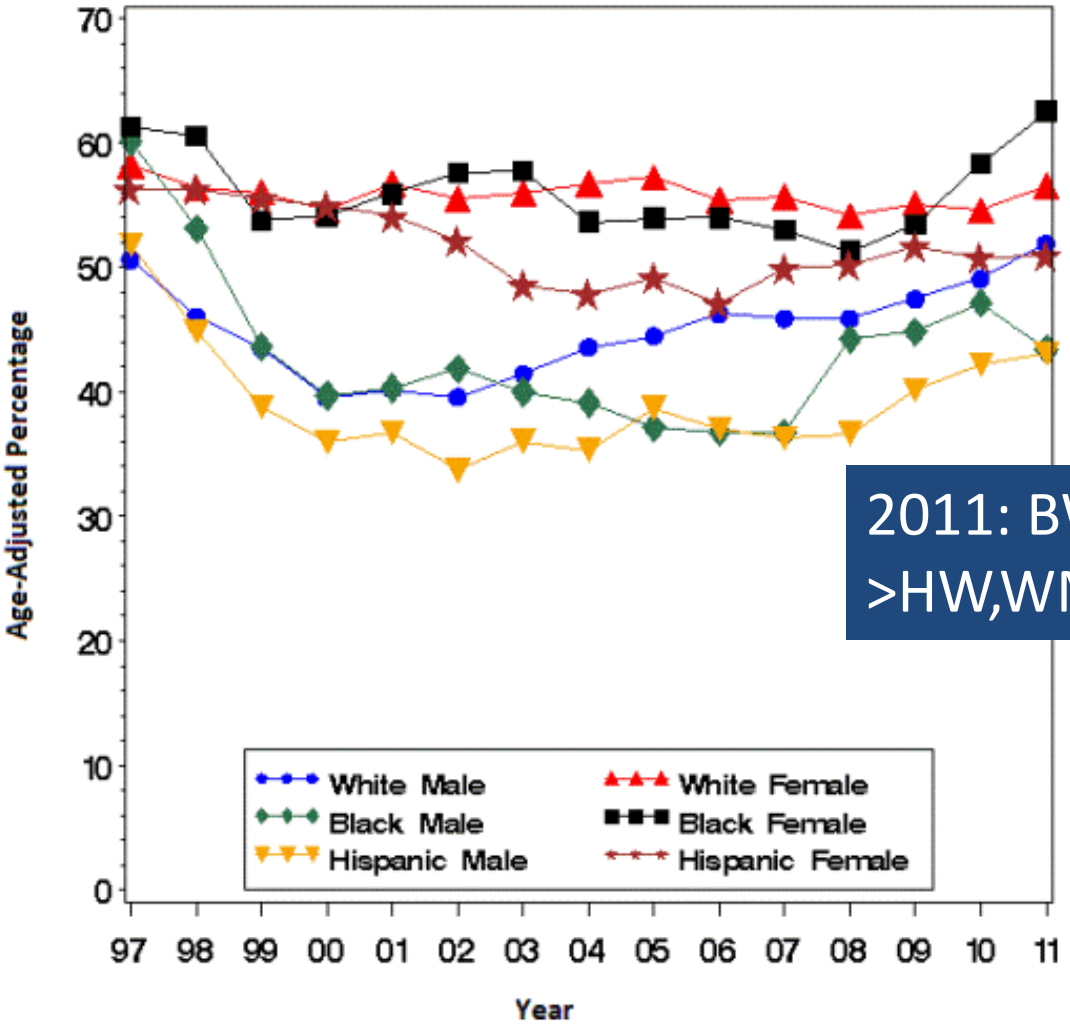


Narrowing of gap in 2003-2006

Age-adjusted
NHANES

http://www.cdc.gov/diabetes/statistics/bp/bp_pct2byraceth.htm

Adults with diabetes reporting any mobility limitation by race/sex

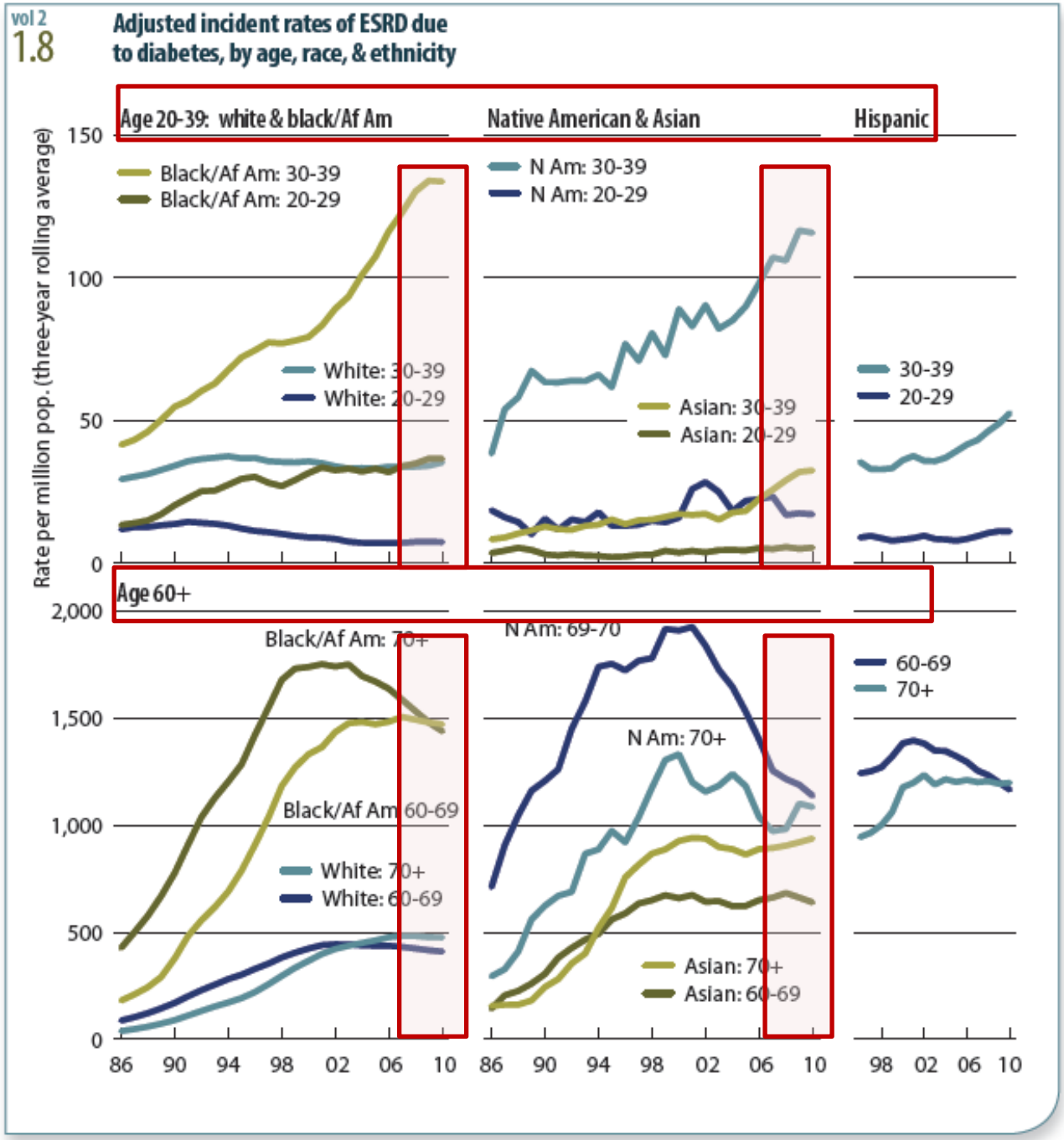


2011: BW >WW >HW,WM >WM, BM

NHIS

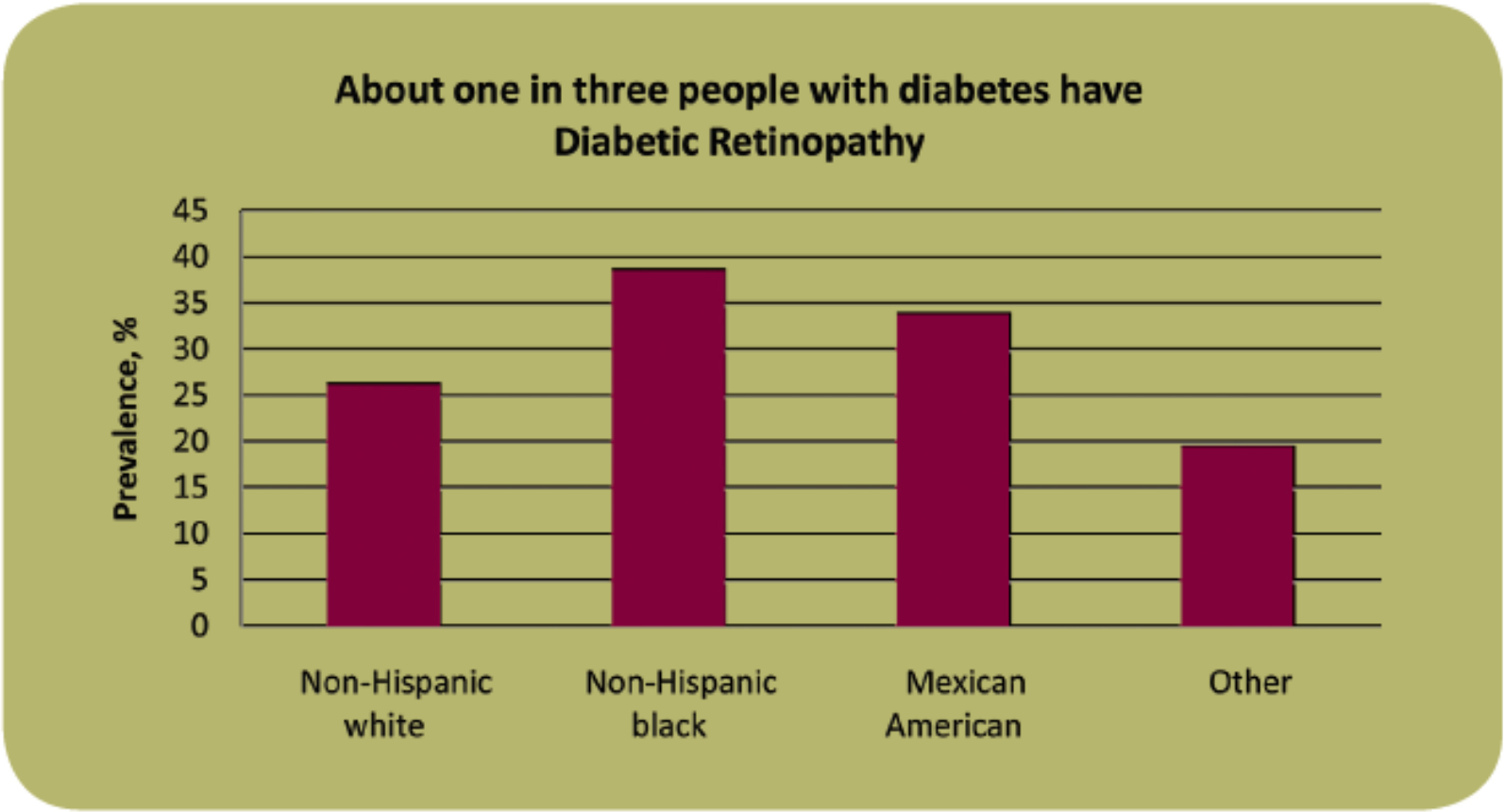
http://www.cdc.gov/diabetes/statistics/mobility/health_status/fig4.htm

Racial disparities in incident diabetic ESRD



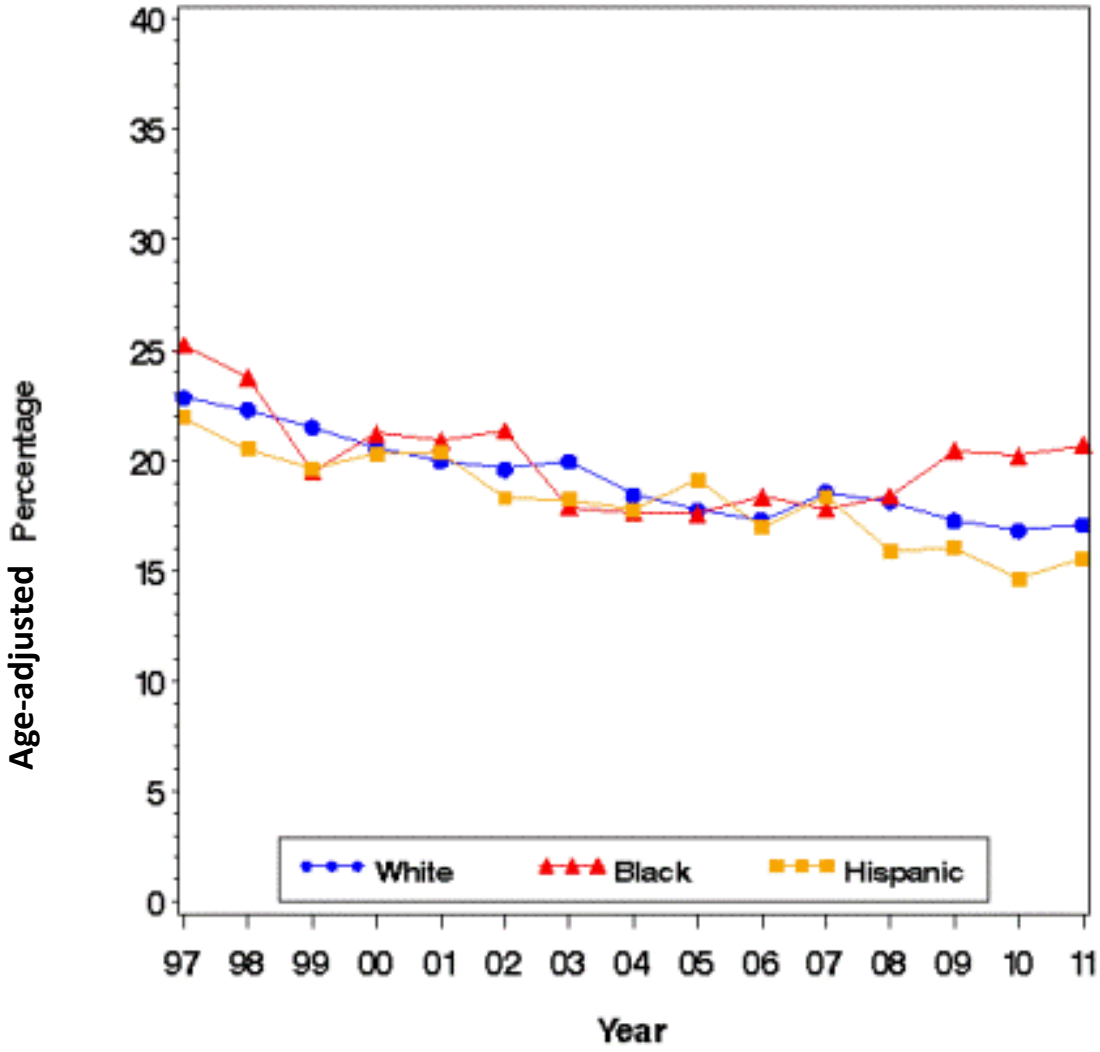
2012 Atlas of ESRD, USRDS.

Diabetic retinopathy by race in NHANES (2005-2008)



http://www.cdc.gov/visionhealth/pdf/factsheet.pdf

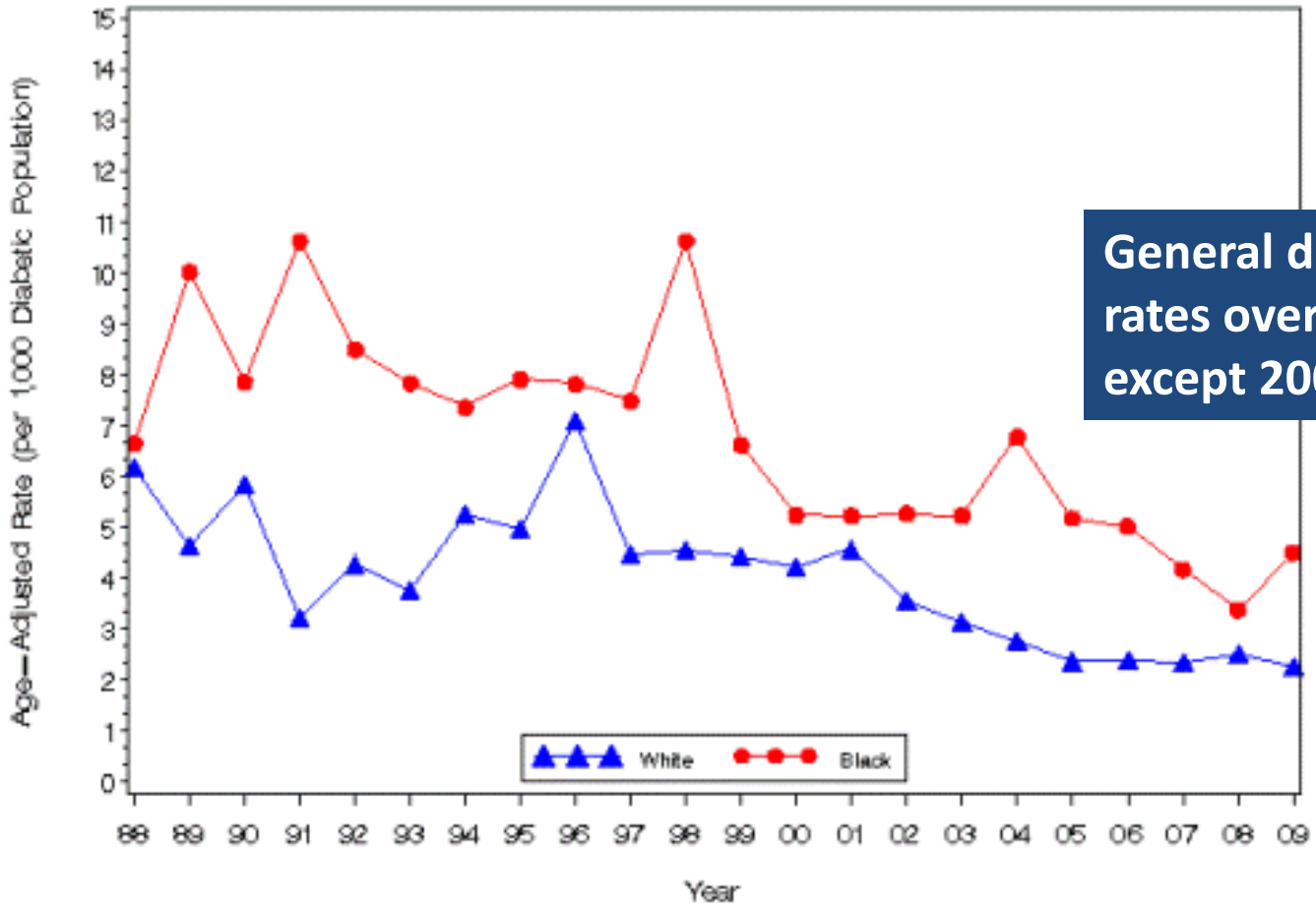
Blacks with diabetes more likely to report visual impairment vs. whites/Hispanics



NHIS

http://www.cdc.gov/diabetes/statistics/visual/fig5.htm

Hospitalizations for lower extremity amputations among adults with diabetes higher among blacks vs. whites

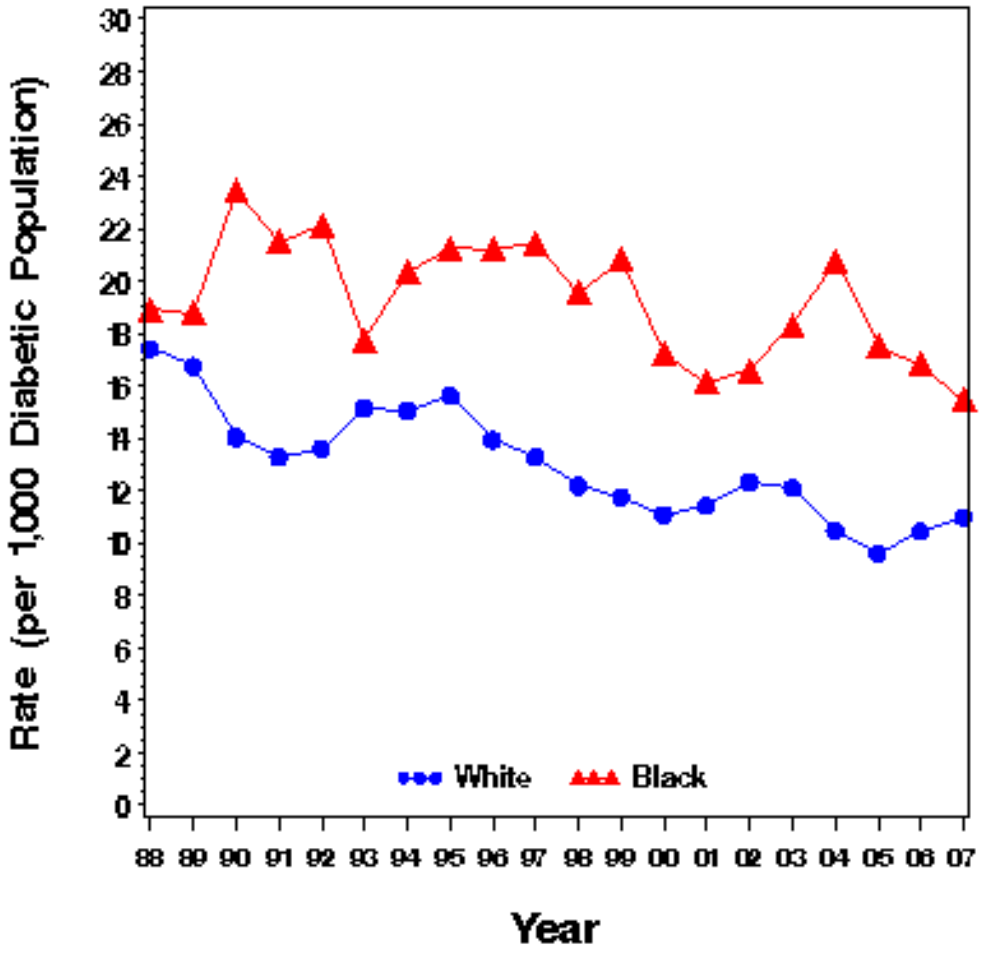


General decrease in rates over time except 2009

National Hospital Discharge Survey and NHIS

http://www.cdc.gov/diabetes/statistics/lea/fig6.htm

Hospitalization for any lower extremity condition among adults with diabetes higher for blacks vs. whites

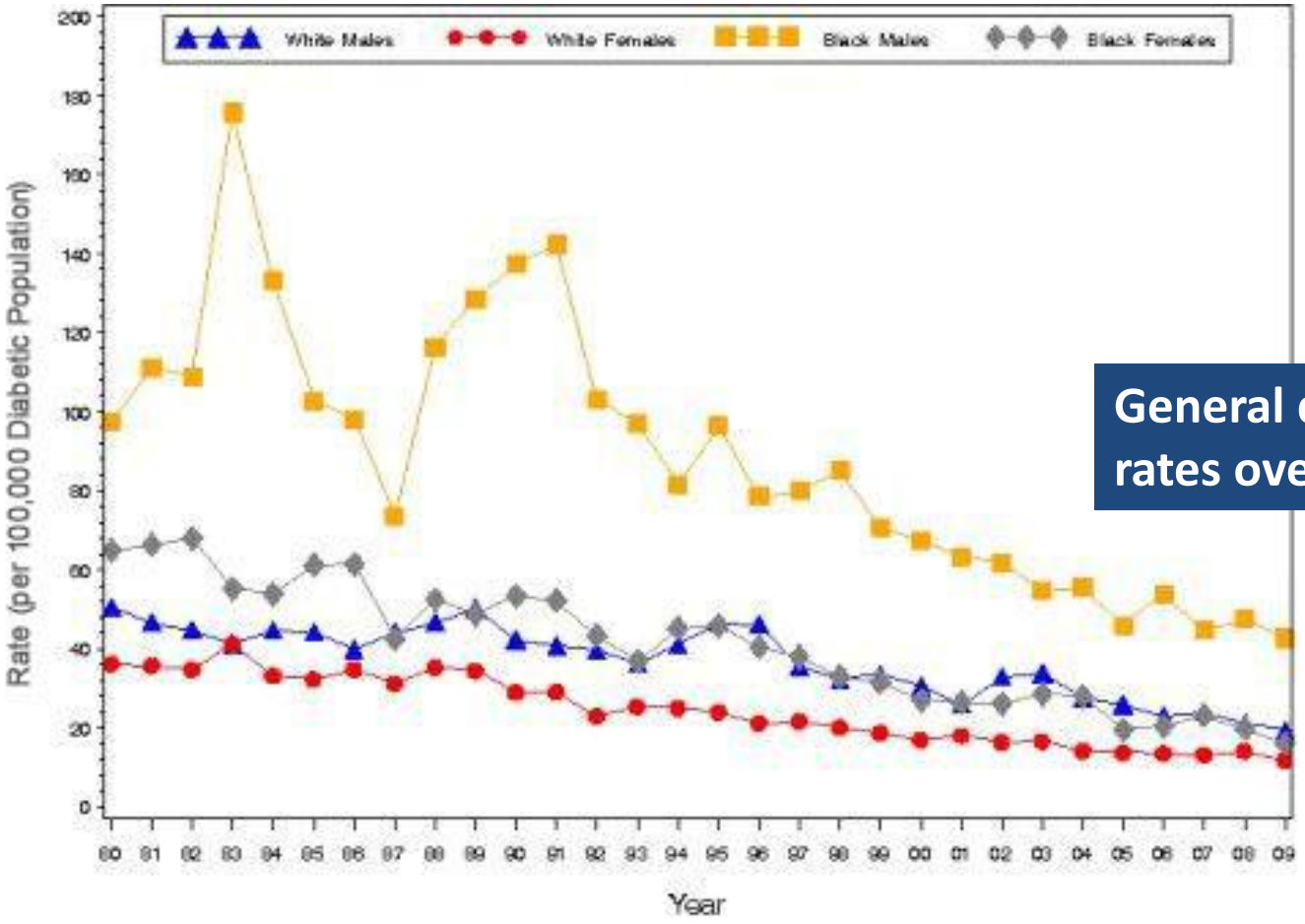


General decrease in rates over time

National Hospital Discharge Survey and NHIS

http://www.cdc.gov/diabetes/statistics/hosplea/diabetes_complications/fig9.htm

Hyperglycemic crisis mortality: BM >BW, WM >WW

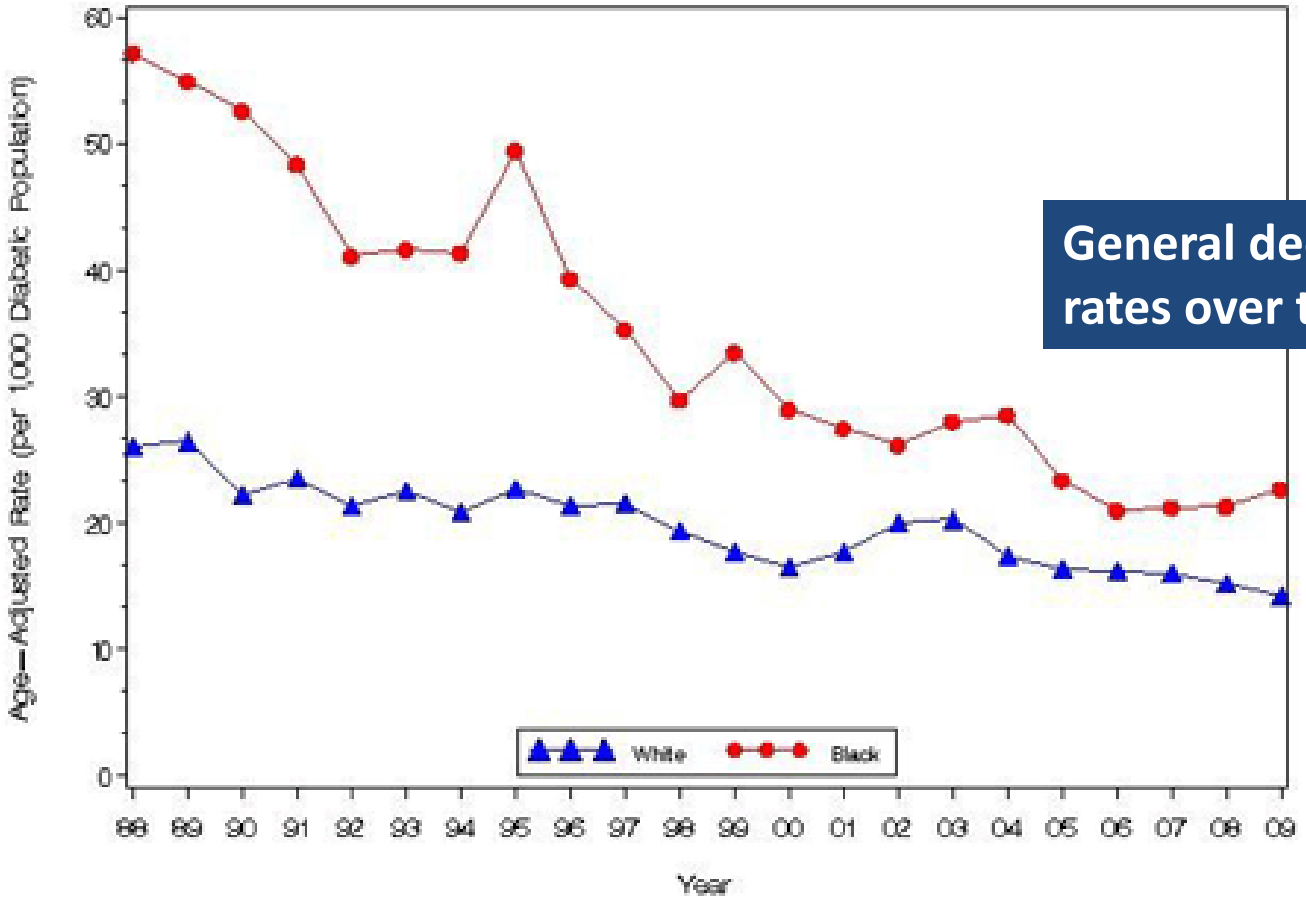


General decrease in rates over time

NHIS

http://www.cdc.gov/diabetes/statistics/mortalitydka/fRateDKAByRaceSex.htm

Hospitalization for DKA higher for blacks vs. whites

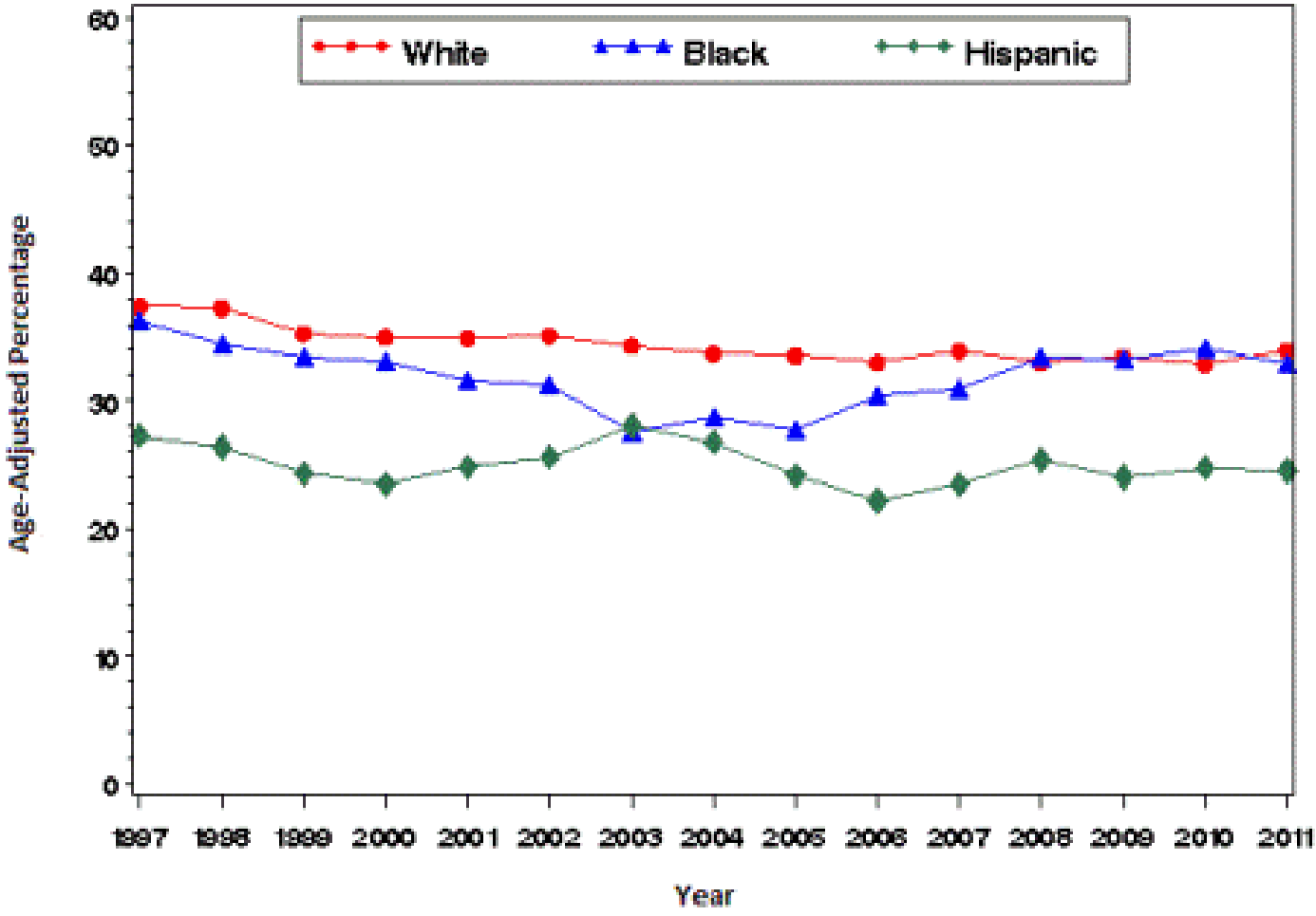


General decrease in rates over time

National Hospital Discharge Survey and NHIS

http://www.cdc.gov/diabetes/statistics/dkafirst/fig6.htm

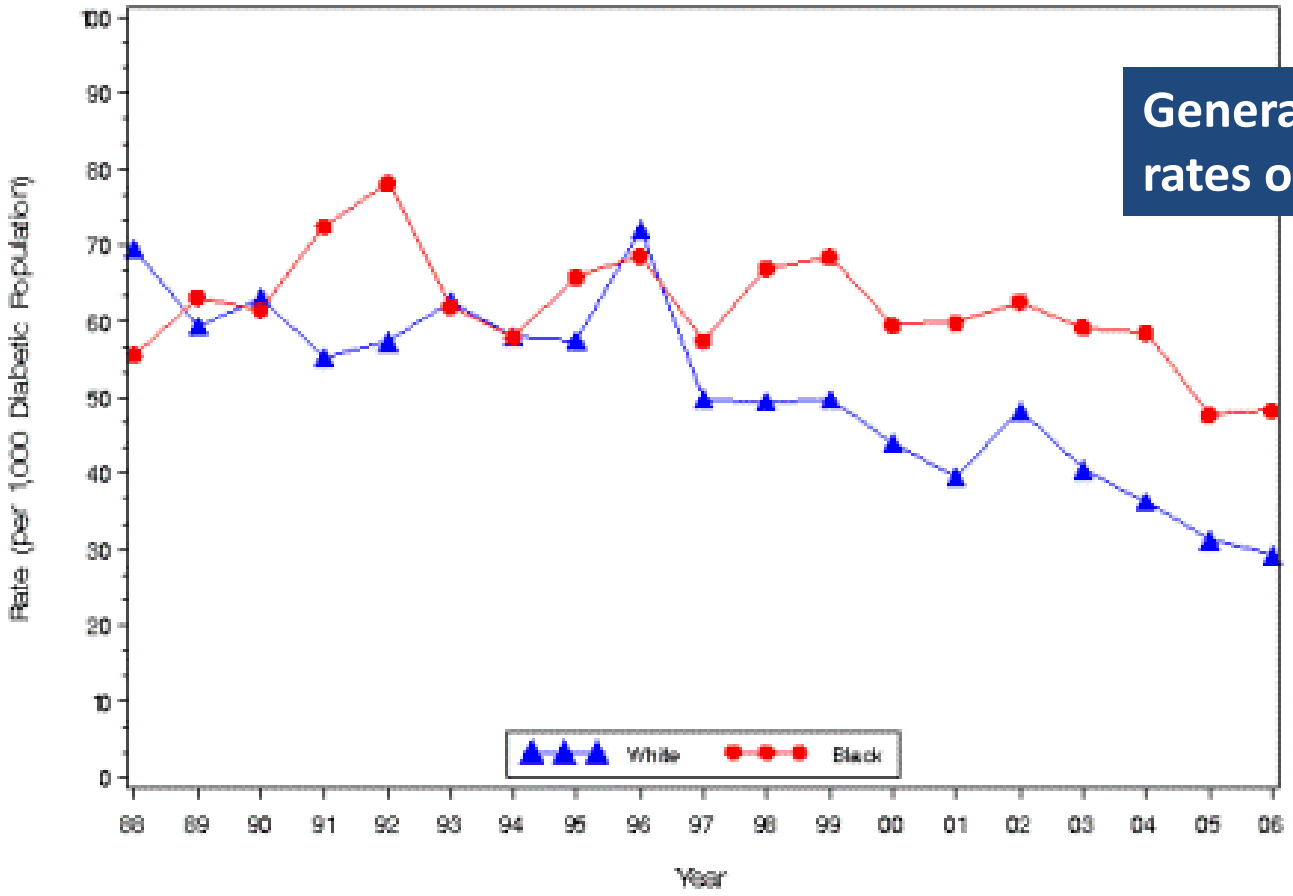
Adults with diabetes reporting heart disease or stroke by race/ethnicity



NHIS

http://www.cdc.gov/diabetes/statistics/cvd/fig6.htm

Hospitalization for CVD among adults with diabetes higher for blacks vs. whites

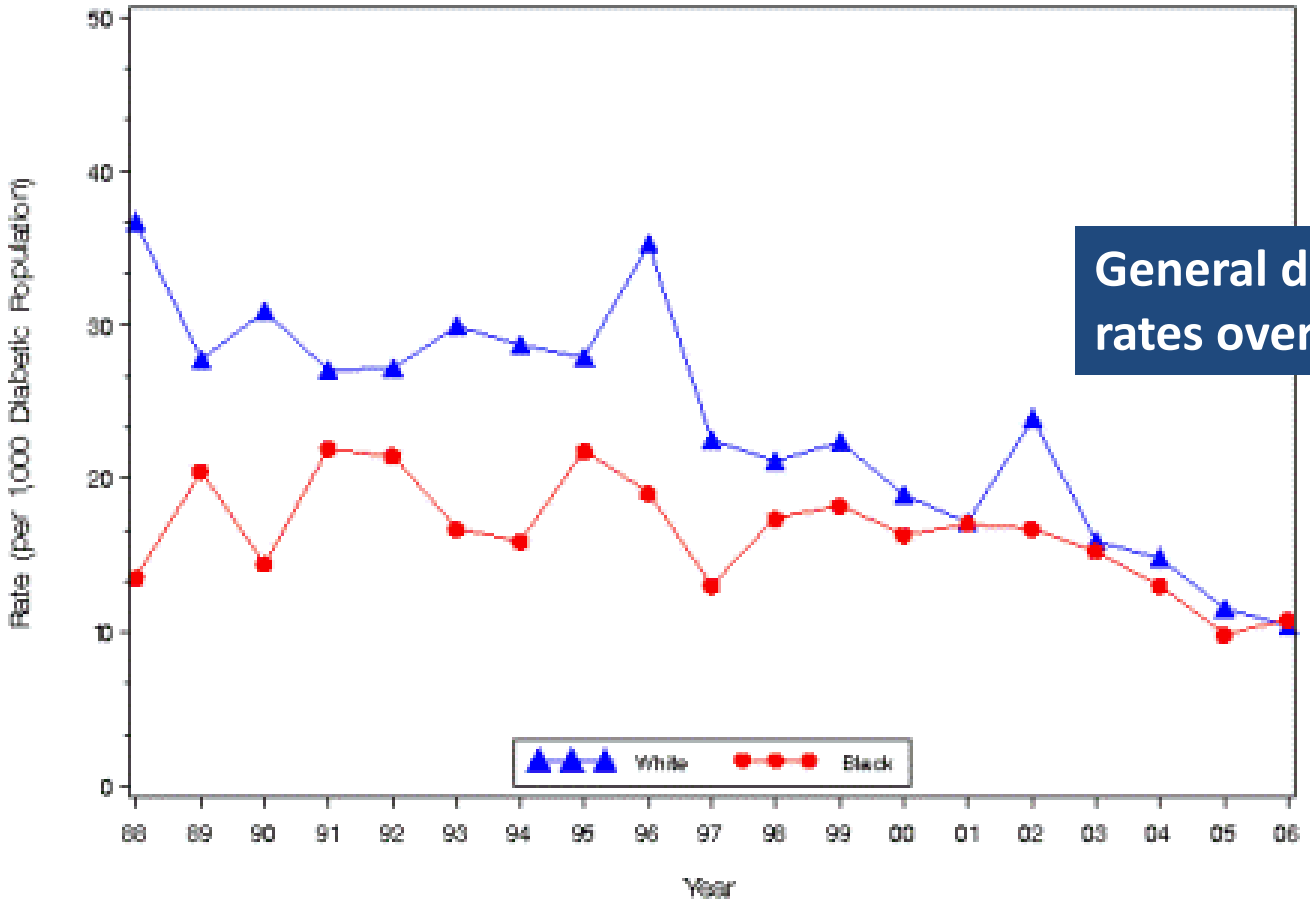


General decrease in rates over time

National Hospital Discharge Survey and NHIS

http://www.cdc.gov/diabetes/statistics/cvdhosp/cvd/fig6.htm

Hospitalizations for ischemic heart disease among adults with diabetes higher for whites until ~2003

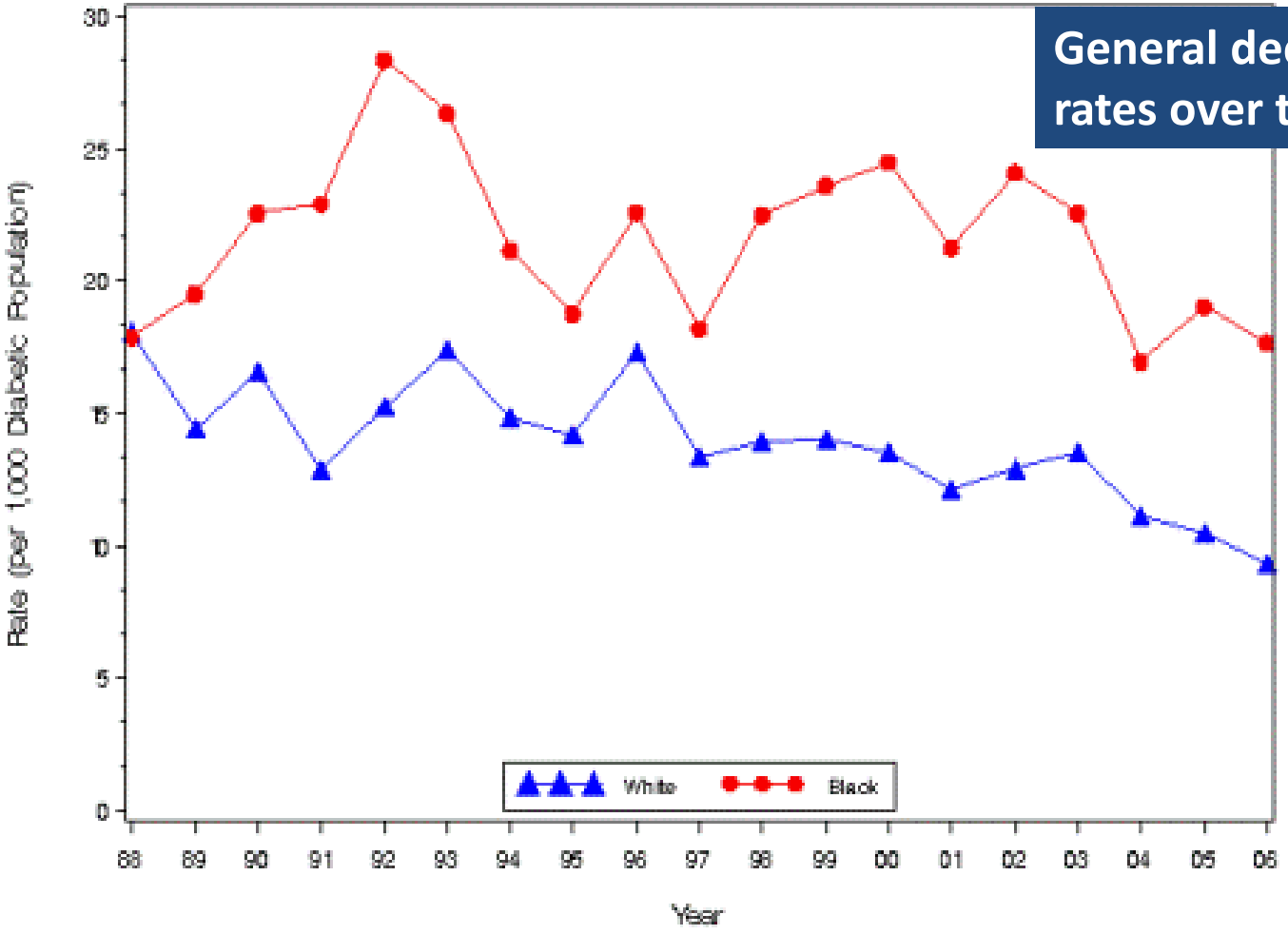


General decrease in rates over time

National Hospital Discharge Survey and NHIS

http://www.cdc.gov/diabetes/statistics/cvdhosp/ihd/fig6.htm

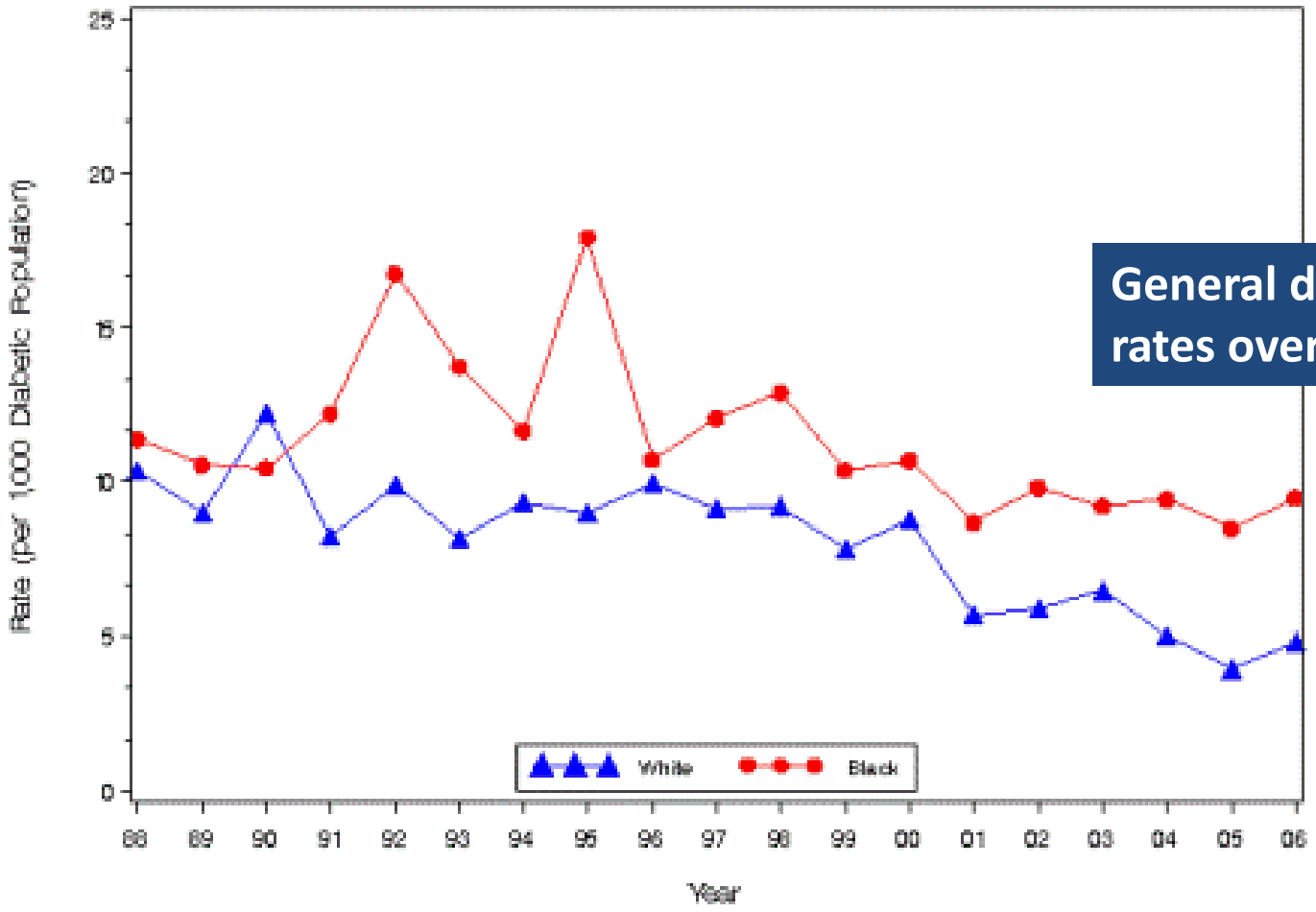
Hospitalizations for CHF among adults with diabetes higher in blacks vs. whites



National Hospital Discharge Survey and NHIS

http://www.cdc.gov/diabetes/statistics/cvdhosp/hf/fig6.htm

Hospitalizations for stroke among adults with diabetes higher for blacks vs. whites

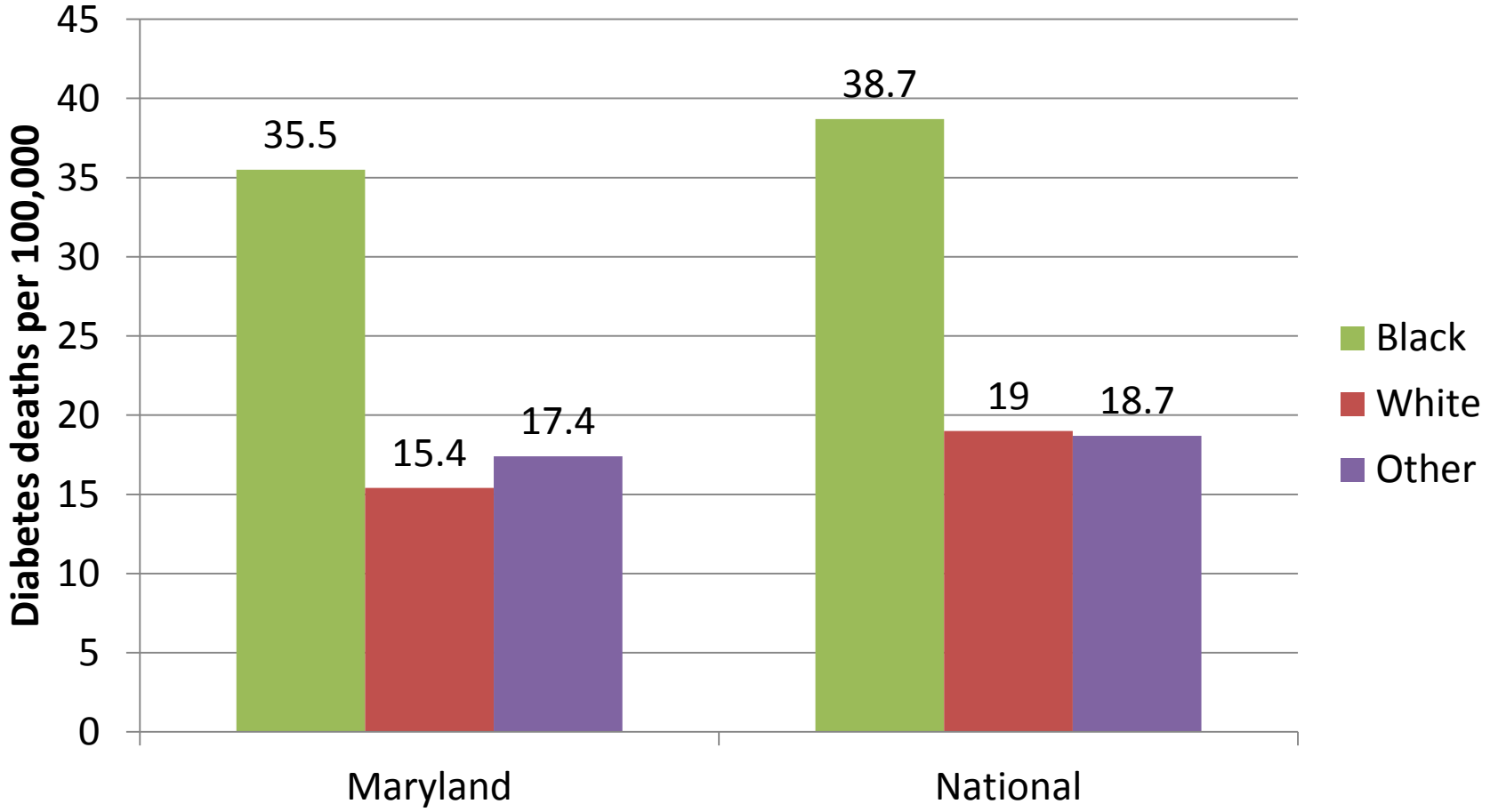


General decrease in rates over time

National Hospital Discharge Survey and NHIS

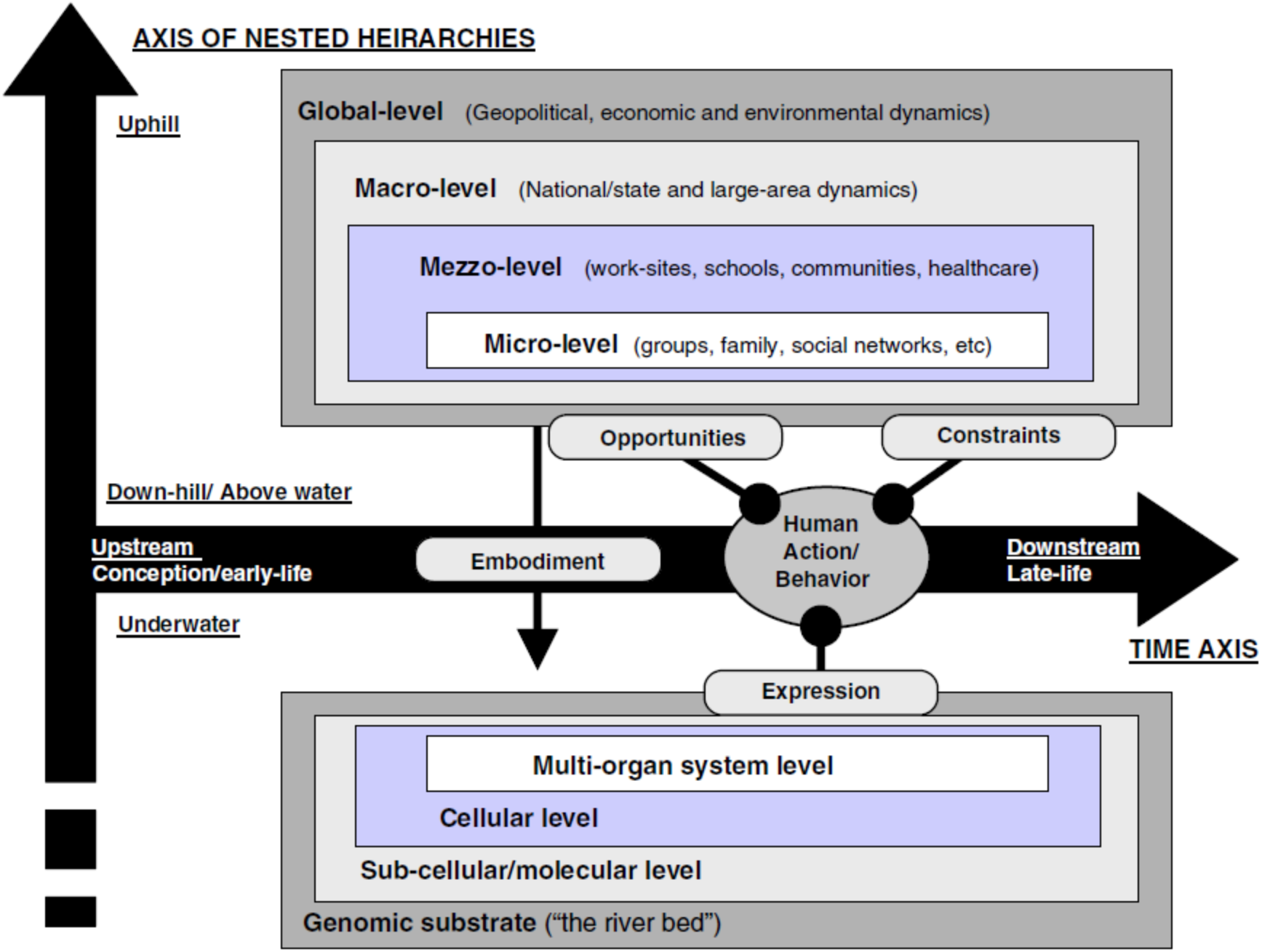
http://www.cdc.gov/diabetes/statistics/cvdhosp/stroke/fig6.htm

Diabetes-related mortality by race (2010)

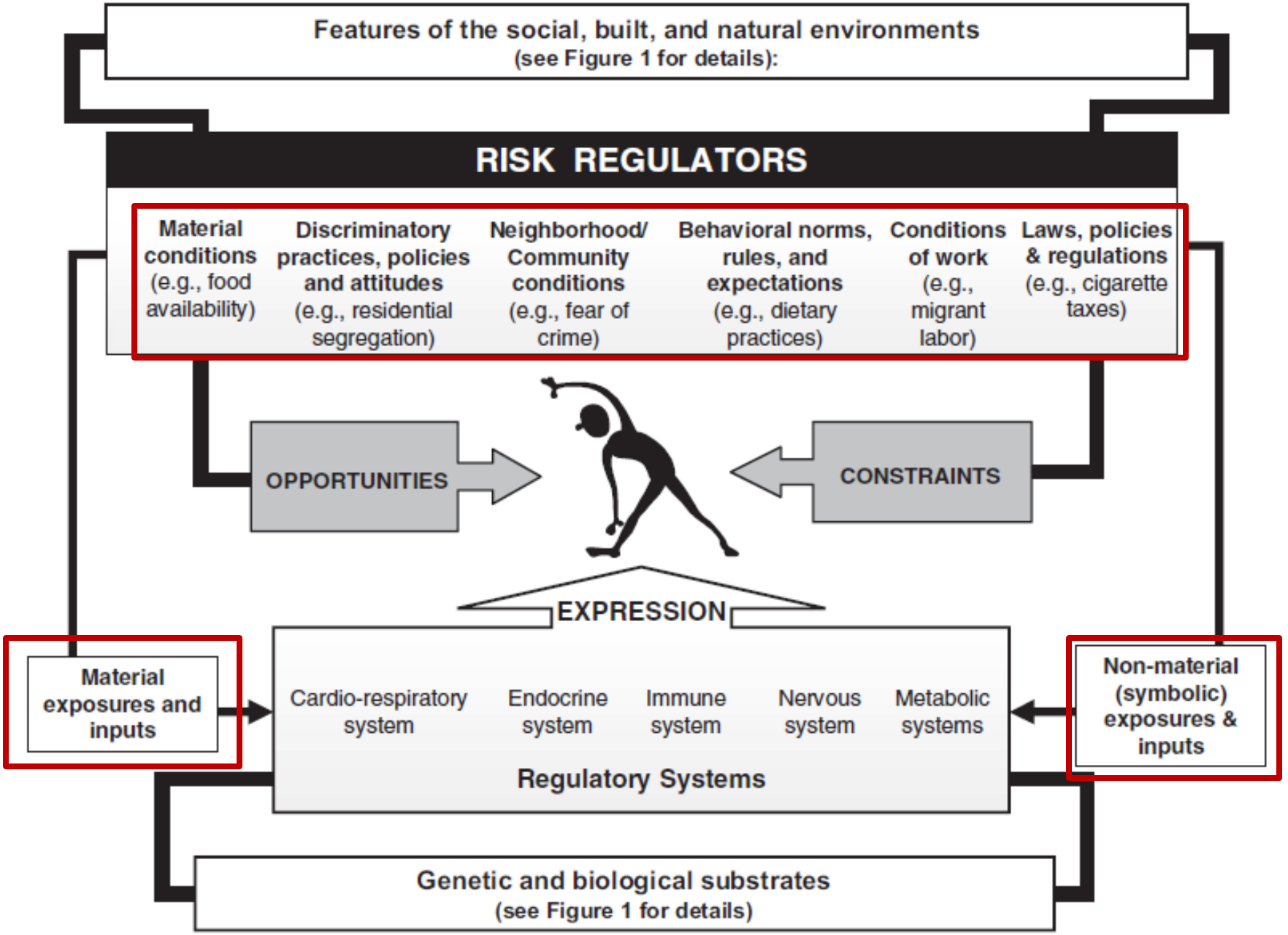


http://kff.org/other/state-indicator/diabetes-death-rate-by-raceethnicity/

STRATEGIES TO REDUCE DISPARITIES IN DIABETES



Glass TA, McAtee MJ. Social Science & Medicine 2006;62:1650-1671



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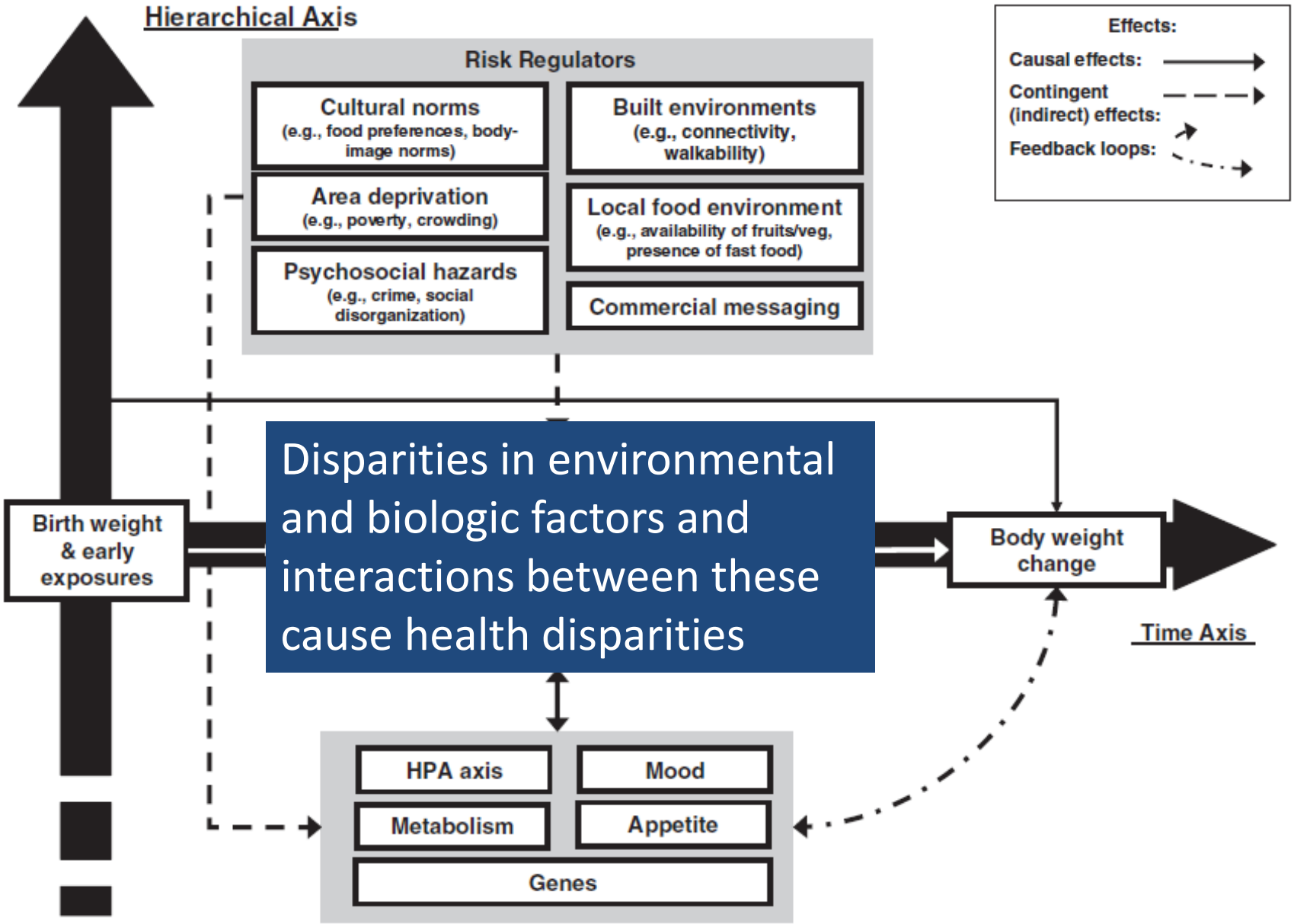
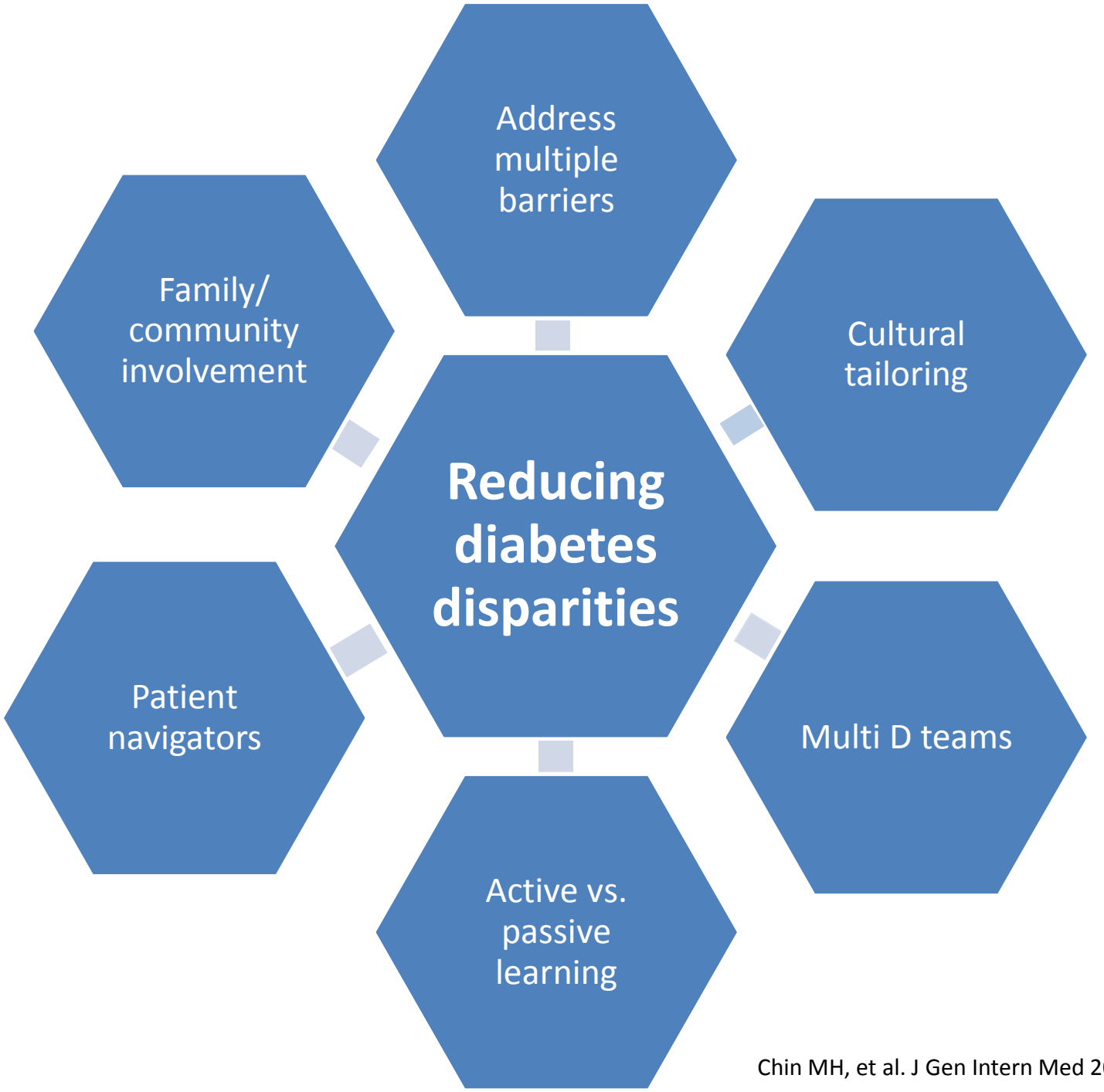


Glass TA, McAtee MJ. Social Science & Medicine 2006;62:1650-1671



Chin MH, et al. J Gen Intern Med 2012;27:992-1000

Knowledge needed to reduce racial/ethnic disparities in diabetes

- Biology of adiposity
- Genetic determinants of risk and response to intervention
- Impact of acculturation
- Epidemiology of diabetes complications

Golden SH, et al. J Clin Endocrinol Metab 2012;97:E1579-1639

Implementation of established interventions

- Patient-specific
  - Culturally-tailored interventions
  - Community-based interventions
  - Emphasis on interpersonal relationships vs. technology
- Provider-specific
  - In-person feedback vs. computerized decision support/reminders
  - Cultural competency training
  - Performance reports including race/ethnicity of patients
- System/community
  - Care management especially with employment of treatment algorithms by non-physicians
  - Emphasis on population health with increased access

Golden SH, et al. J Clin Endocrinol Metab 2012;97:E1579-1639
Chin MH, et al. J Gen Intern Med 2012;27:992-1000

National Diabetes Prevention Program

- Led by CDC → infrastructure
  - Standard operating procedure
  - Certification process and evaluation
  - Marketing materials
- Based on known effective intervention (DPP)
  - In-person group intervention
  - Trained lifestyle coaches
  - Multiple barriers/problem-solving addressed
- Community-based – not limited to clinics
- Reimbursement increasing

Change Your Lifestyle. Change Your Life.

There are more than 29 million Americans currently living with diabetes. Another 86 million Americans are living with prediabetes, and most of them do not know it. Without weight loss or moderate physical activity, many people with prediabetes will develop type 2 diabetes within 3 years. Type 2 diabetes is a serious condition that can lead to health issues such as heart attack; stroke; blindness; kidney failure; or loss of toes, feet, or legs.

The Imperative's ***Change Your Lifestyle. Change Your Life.*** lifestyle change intervention is part of the National Diabetes Prevention Program, led by the Centers for Disease Control and Prevention. Through this program, we are helping Black women and Latinas make lasting lifestyle changes to reduce their risk of type 2 diabetes and its related complications. Through strategies such as goal setting, food and activity tracking, weight monitoring and self management, we are able to influence positive health behaviors that impact the program participants and their families.

The Imperative has a strong network of community partners that bring the program to states with high rates of diabetes and prediabetes.

- Black Women for Wellness, Los Angeles, CA - http://www.bwwla.com/index.ph
- Indiana Minority Health Coalition, Indianapolis, IN - http://www.imhc.org/
- The Community Wellness Project, St. Louis, MO - http://www.cwpstl.org/cwp_home.html

What can you do today about racial disparities in diabetes?

- Actively recognize disparities
  - Look at your data
- Raise awareness of disparities at your work place
  - Encourage review of data at system level
- Target racial disparities as part of your work in clinical care and in quality improvement initiatives

Chin MH, et al. J Gen Intern Med 2012;27:992-1000

Thank you

- Johns Hopkins General Internal Medicine
  - Frederick Brancati, MD, MHS
  - Jeanne Clark, MD, MPH
- Johns Hopkins Epidemiology
  - Linda Kao, PhD, MHS
  - Elizabeth Selvin, PhD, MPH